...E HEATING DEPARTMENT

The Farm

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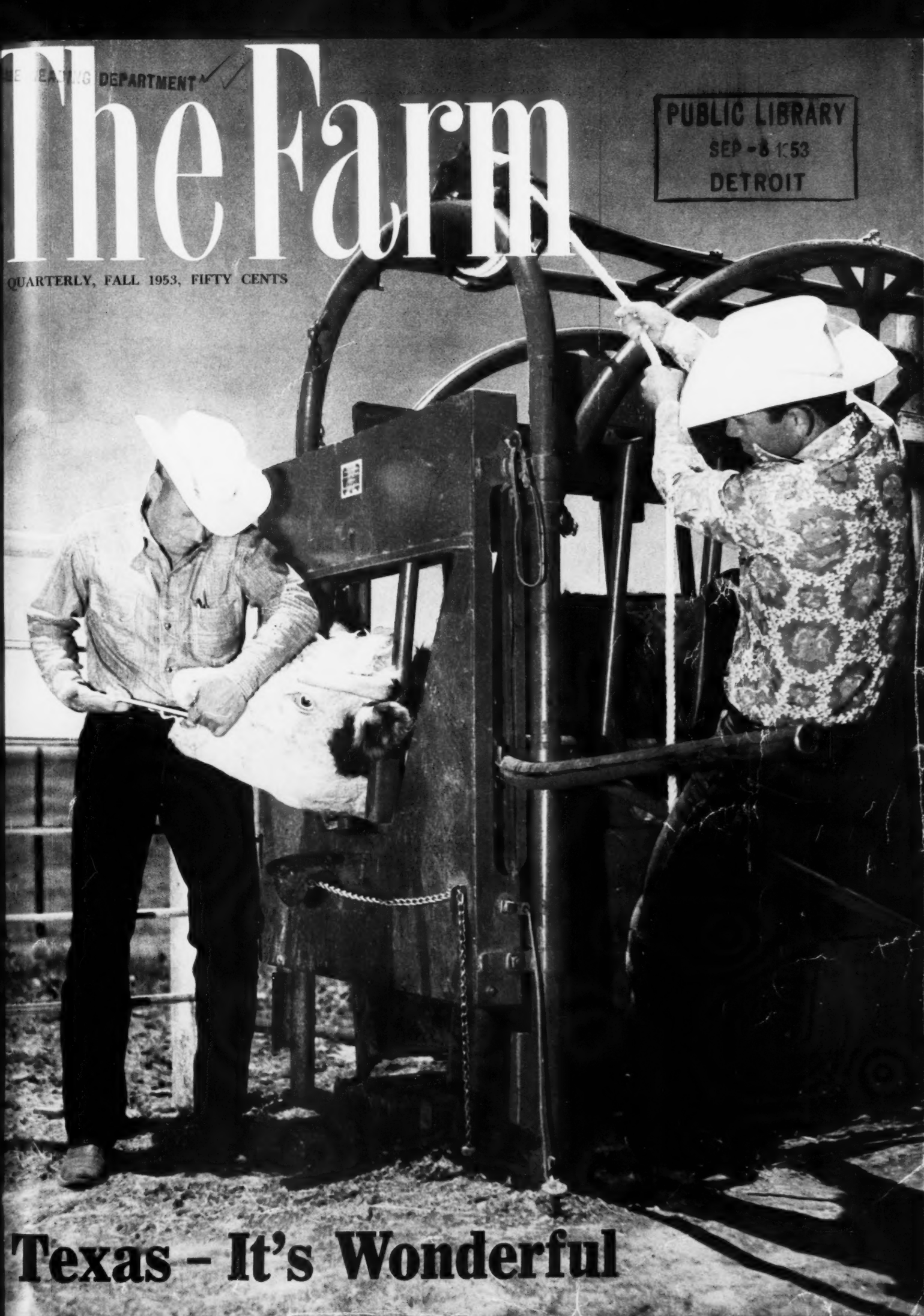


Texas – It's Wonderful

These ruler-straight lugs pull better—wear better!

You'll agree that many tough farm jobs take super pulling power—and that's where SUPER-SURE-GRIPS shine! Year in, year out, they prove that Goodyear's famous *wedge-in action* holds soil in place like no other—boosts you through the toughest jobs on any man's farm!

And such even wear! No other tractor tire tread lasts like SUPER-SURE-GRIP—in the field or on the road!

No wonder more farmers surveyed prefer Goodyears than the next two makes put together!

SUPER-SURE-GRIPS cost no more, so see your helpful Goodyear dealer next time you're in town. Goodyear, Farm Tire Department, Akron 16, Ohio.

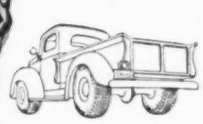
WHAT TO LOOK FOR WHEN YOU BUY TRACTOR TIRES:

1. RULER-STRAIGHT LUGS come closer together at shoulders—and so take wedge-in bites that hold soil in place—to give Goodyear tires greater grip.

2. O-P-E-N C-E-N-T-E-R pioneered by Goodyear. Farm experience proves it bites deeper, sharper—pulls better—when combined with straight lugs!

3. LONG EVEN WEAR—because Goodyear straight lugs work against the soil evenly, they wear evenly, roll smoothly on the road, wear longer.

THERE'S A SPECIALLY DESIGNED GOODYEAR TIRE FOR EACH VEHICLE ON THE FARM!



You'll save money, get better service from your truck, family car and farm implements—if you tire them all with Goodyears. That's why more people buy Goodyears, for more uses, than any other tires on earth!

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

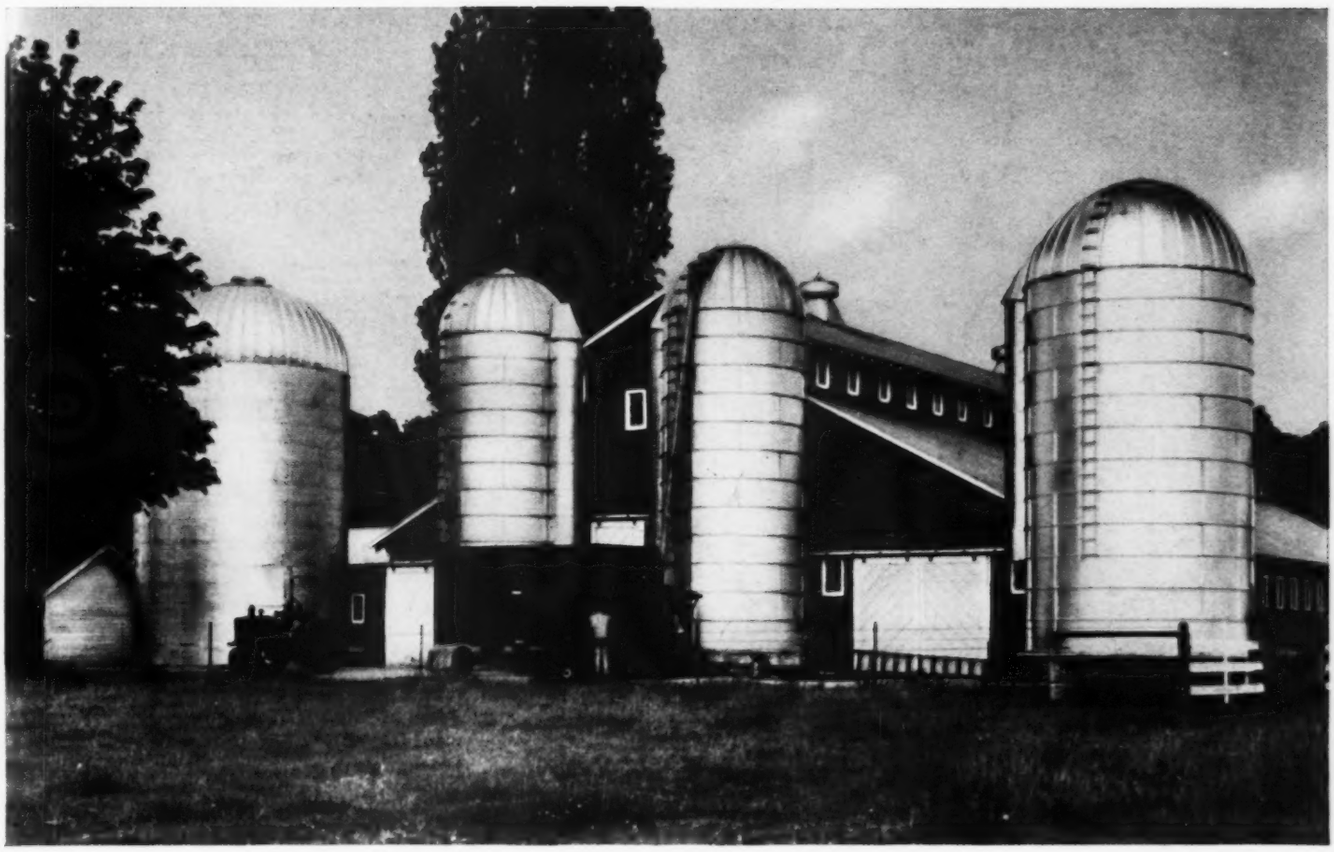
FIRST in Traction • FIRST in Long Wear • FIRST in Popularity!

GOODYEAR

"AMERICA'S STRENGTH IS IN THE LAND—SUPPORT YOUR SOIL CONSERVATION PROGRAM"

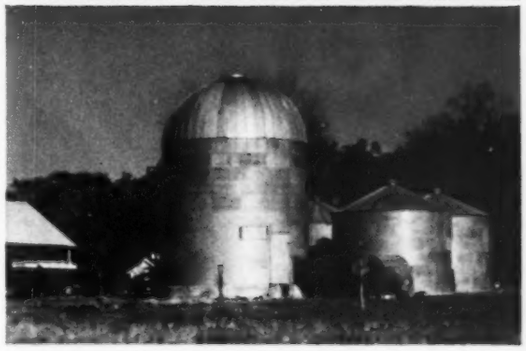
Super-Sure-Grip Tractor Tires

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network



You need MORE than modern farm machinery

TO OPERATE A MODERN FARM



No modern farm can be without labor-saving machinery. But it takes more than that. Modern farming also requires housing, storage and conditioning methods that make the most of that modern machinery, and of present-day scientific knowledge of soils, seed, stock, and feeds.

You need corn cribs and grain bins that double as conditioning systems . . . buildings that let you load, unload and shell out corn without hand labor . . . silos and Haymakers that conserve the *food value* in the crops you raise . . . corn storage and conditioning methods that let you pick corn when it is *ripe* . . . self-feeding Haymakers so cattle can feed themselves . . . weather-proof, rat-proof, fire-proof, labor-saving buildings scientifically designed for modern farm operations.

For nearly 50 years, Martin Methods have helped farmers make the most of their crops—have pioneered in ways to cut farm operating costs while increasing farm productivity. The coupon below will bring you details on how to make the most of *your* next crop. Mail it today!

FREE HELPFUL FOLDERS

. . . SEND COUPON TODAY!

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Please send me FREE literature on Martin Methods for

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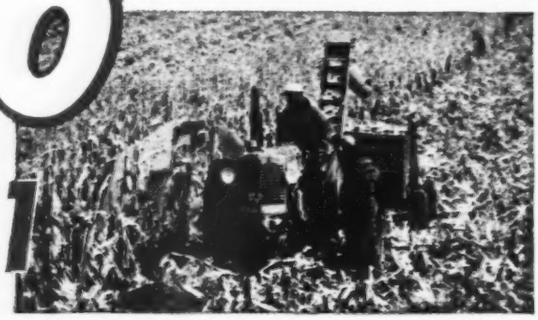
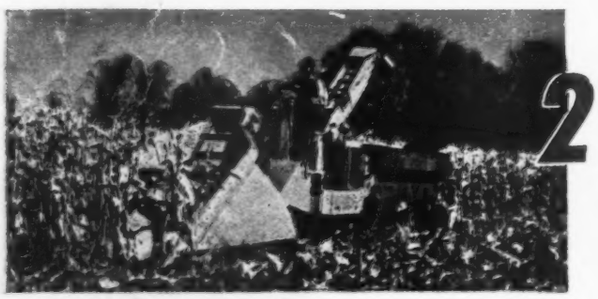
5325

6 WAYS to make more corn money



IMPROVED MM TWO-ROW HUSKOR

Proved and improved! This popular MM pull-behind Two-Row Husker is packed with new MM advantages that save time, work and corn. Six gathering chains, large-capacity corn saver, dual-drive husking bed, belt-drive cleaning fan, and full Uni-Matic control of snapping assembly are outstanding features. Longer picking rolls and 12 husking rolls (6 metal and 6 rubber) handle your heaviest crops easily. Any 2-plow tractor pulls and powers this light-draft, big-capacity Husker.



MM UNI-HUSKOR

This self-propelled Uni-Tractor and Uni-Husker unit pays big dividends in cleaner corn, picked *faster* and with *less work*. Typical MM features include five-position floating snouts, four 53½" long snapping rolls, ten 36" rubber and metal husking rolls, husking raddle with rotating and side-to-side action, cleaning fan for clean, husk-free corn—see it!

MM UNI-PICKER SHELLER

Here's the *one-man, one-trip* corn harvester that picks, and shells your corn *on-the-go* . . . *and* gives you the earliest corn harvest you've ever had! It's the MM Uni-Tractor with the Uni-Picker Sheller mounted piggy-back—built to handle corn up to 30% moisture content and above when necessary. You get your corn while the stalks are still standing, in one fast, easy trip through the field.

See for yourself how far corn harvesting has advanced since last year! Visit your MM dealer and see these advanced MM Huskors soon! Be sure to get facts on the sectional metal and rubber husking rolls.

Now, get tomorrow's FASTER, LOWER-COST HUSKING with the

MINNEAPOLIS MOLINE — MM — MODERN MACHINERY

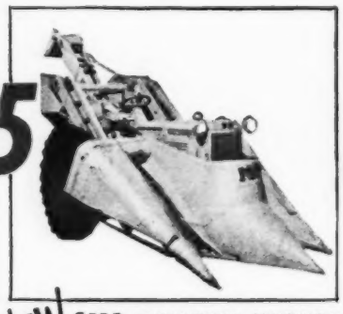
HUSKOR

that fits YOUR farm!

You can demand—and *get*—a *double pay-off* for your summer's work when you harvest your corn with an MM Huskor. *First*, Minneapolis-Moline gives you new design advantages that help you get all the crop you raise for real *bonus* yields . . . machines that deliver *clean* ears, easier to store and feed, worth more in cash. *Second*, all SIX MM corn-harvesting machines give you the speed and economy that let you get your crop in *faster*, *easier*, at *lowest* possible cost. This year, *gain* with the bonus values that make MM corn Shellers the world's leading sellers, that make MM Huskors and the Picker-Sheller preferred equipment in so many fields. Read the facts below. Make more money off *your* fields, off *your* corn crop.

MM 1-ROW PULL-BEHIND HUSKOR

Here's husking capacity at its one-row best. This MM Huskor gives you all the owner-tested advantages that have made MM pull-behind models preferred on so many farms, *and* the advanced features that put this year's model right out in front of the field. Three gathering chains, eight new sectional type metal and rubber husking rolls, 53½" snapping rolls, Uni-Matic control of floating snouts . . . all combine to give you a real profit harvest of your corn crop. A one-row corn snapper is also available.



NEW MM MOUNTED HUSKOR FOR THE ZB TRACTOR

With the new MM Two-Row Mounted Huskor on the new 2-3 Plow ZB Tractor, you get self-propelled visibility and instant control. Four 53½" snapping rolls, six gathering chains, full-length and full-width husking raddle, ten 36" sectional type metal and rubber husking rolls, exclusive MM cleaning fan, large capacity corn saver, fingertip Uni-Matic control, and simple hookup for mounting, are features that pay you in a faster, easier, more *profitable* corn harvest.

NEW MM MOUNTED HUSKOR FOR THE UB TRACTOR

This new MM Mounted Huskor teams with the new 3-4 plow MM UB Tractor to give you visionlined, big-capacity corn husking at its low-cost best. Enjoy full Uni-Matic control at your fingertips . . . watch the four 53½" snapping rolls and the ten 36" combination steel and rubber husking rolls . . . large capacity corn saver and exclusive MM cleaning fan put *more* of your crop in the wagon—at a new low cost.

MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA

Now...automatic hitching with FARMALL

Fast-Hitch

for the McCormick® Farmall® Super C

1. JUST BACK IN

MAKES HITCHING A *SNAP!*

2....AND GO!

The easiest, fastest way to hitch implements ever developed!

There is nothing like it. It's so new—so revolutionary—so advanced—that you'll want to try Farmall Fast-Hitch yourself.

Here is all you do. Back up the Farmall Super C, line up the sockets to meet the twin coupling beams on the implement. As you back, the beams slip into the hitch sockets and lock *automatically, instantly, precisely.*

You touch a hydraulic lever, up comes the implement—and you are ready to work—*all without leaving the seat.*

Try Farmall Fast-Hitch NOW. See your International Harvester dealer. Have him show you how—for the first time—you can have complete implement control!

Send coupon **for free booklet giving complete information**

International Harvester Company
P. O. Box 7333, Dept. FQ-F, Chicago 80, Illinois
Yes! Tell me more about the new Farmall Fast-Hitch.

Name .....

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I farm ..... acres. Principal crops .....

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International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—
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** Good management practices*
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Your herds' health and vigor depend, first of all, on careful management . . . on your special skill in breeding, feeding, care and sanitation.

But today, due to constant demands for higher production, their health also depends more than ever on the skills of two other specialists – your veterinarian, and your veterinary drug manufacturer.

With great forward strides in veterinary medicine, your veterinarian plays a vital role in helping you solve complex health and disease problems.

His special scientific skill . . . his thorough knowledge of new developments . . . are indispensable in diagnosing and treating your livestock.

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Marching shoulder-to-shoulder with you . . . your veterinarian and Squibb are your staunch allies in helping keep your livestock healthy, thrifty, and more profitable.

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CONSTANT RESEARCH
Squibb scientists are constantly seeking and discovering new and better drugs . . . to aid your veterinarian in bringing better health to your livestock.

For prompt, accurate diagnosis, always consult your veterinarian.

SQUIBB – **A NAME YOU CAN TRUST**

Farm Quarterly, Vol. Eight, No. Three. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by the Automobile Digest Publishing Corp.,
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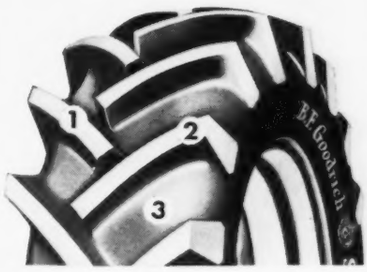
B.F.Goodrich

announces a new, bigger tire—

Power Grip



❶ BIGGER CLEATS
for a bigger bite

❷ BIGGER SHOULDERS
for longer wear

❸ BIGGER ALL AROUND
for more pull

It looks bigger . . . it is bigger!

BIGGER! More powerful! It's America's newest rear wheel tractor tire—the B. F. Goodrich Power-Grip!

Look at those husky knife-action cleats. The high shoulders permit deep penetration. Knife-action cleats bite deeper, give you greater drawbar-pull. Heavy implements, wet ground or slick cover crops won't interrupt your work schedule when these B. F. Goodrich cleats dig in and go to work.

Measure the broad, wide tread and you'll find that no leading make of tire is wider than Power-Grip. This means the tire has a larger footprint, gives greater flotation.

Bigger Power-Grip shoulders mesh with the soil like the teeth of a gear, take a firm grip for full traction in reverse as well as forward. You work more land in less time because these rugged, square-cut shoulders defy slippage. Every turn of a Power-Grip tire counts for traction.

The B. F. Goodrich Power-Grip tractor tire *is* bigger and better in every way. It pulls better, gets you through the roughest going without wasting valuable time and fuel. It's the biggest tire value on the market today. See new Power-Grip tires at your B. F. Goodrich retailer's store. The address is listed under Tires in the Yellow Pages of your phone book. Or send in the coupon below.

IT'S A NEW, BIGGER TIRE. It's the type and size tire that comes on new tractors. Size for size, no leading make of tractor tire is bigger than a B. F. Goodrich Power-Grip. You can replace old, worn tires with big BFG tires and get more power out of your tractor.

THE POWER-GRIP OPEN-CENTER TREAD cleans naturally as it rolls. Dirt is thrown from the open center and open channels by the flexing action of the tire. Each knife-action cleat is free to dig into the soil. And the B. F. Goodrich Power-Grip tread stays clean.

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

The B. F. Goodrich Company
Department F-106, Akron 18, Ohio

Please send me free information on
☐ Power-Grip tires ☐ "Easy Steer" front tires
☐ Truck tires ☐ Tubeless passenger car tires
☐ Name of my nearest retailer

Name_____

Address or RFD_____

Town_____

State_____

The rung of a ladder....

"The rung of a ladder was never meant to rest upon, but only to hold a man's foot long enough to enable him to put the other somewhat higher."

—Thomas Huxley

Those eloquent lines embody a principle that has been followed at John Deere for more than a century.

Pausing on each rung just long enough to make sure of their footing, John Deere engineers, for instance, are climbing ever upward, finding new ways to speed up your farming . . . to lighten your work . . . to increase your profits.

The results, of course, are manifold. But none are more valued than farmer respect and enthusiasm for John Deere products, which—in 116 years of service to American agriculture—have never been higher than they are today. And by this very measure, recent progress in the design and manufacture of John Deere Farm Equipment has been particularly outstanding.

The latest "rung of achievement" is the Model "70" Tractor, shown below. An important new member of a famous family, the John Deere Model "70" is a powerful tractor, with feature after feature that proclaim it the modern tractor for the large row-crop farm . . . a tractor that continues and accentuates the famed John Deere policy of offering farmers across the nation the utmost in modern design and proved performance . . . in quality farm equipment.

Drop in and see your John Deere dealer. He'll be glad to show you the Model "70" and tell you all about the many other new and field-proved machines in today's John Deere line of quality farm equipment.

JOHN DEERE MOLINE, ILLINOIS

COMING IN WINTER

For the Winter issue THE FARM is particularly pleased with a fine selection of titles. The leading article, "Let's Face Facts," will be a survey outlining what seems to be ahead for the farmer. Will there be subsidies, quotas, free competition; will there be more, or less, politics in farming; how should the farmer plan for the next several years?

Less farm labor means more machinery. "Bulk Handling" will list the newest machinery for handling, with less labor and time, the heavier and bulkier crops, feed, and fertilizer. We feel that it is time for a new look at lime, which, in the last few years, has come to be regarded as a plant food rather than as a soil "sweetener." Is Johnson Grass a friend or an enemy? Our story will tell how to profit from this so-called pest if it happens to invade your farm.

Molasses has become an important feed, a good substitute for grain, and not expensive. The latest feeding management will be given in detail. There will be a story on peas as a farm crop and another on how a California feeder is fattening 16,000 lambs on dry lot.

Cattle men have rarely been as enthusiastic about a hybrid as they are about the relatively new Charbray, a cross of the Brahman with that fine beef animal, the French Charolais. There will be photographs of the new breed as well as the Charolais, both domestic and foreign.

Because of the drought in the cattle country, cattle are moving to the feedlots and ranges of the north and Midwest on consignment. What are the dollar and cents aspects of feeding cattle on consignment and what is a fair contract for feeder and owner? In some parts of the West where rainfall is only eight inches there is a wholly different race of farmers who get along about as well as those favored with forty inches. "Dry Farming" will describe their methods and management. There will be an article on the caponizing of broilers and how they are marketed and another on the advantages of owning farm scales, so that the weight of cattle and other farm animals can be checked as they are fed.

There will be a feature on wild rice, that favorite of the gourmet, and how it is harvested in the northern marshes, cleaned, and marketed.

A foreign writer and photographer have teamed up to document a most fascinating story on the annual trek of the shepherds of southern France to the mountain pastures near the Italian border. Among the feature articles will be a tale about the opossum, that most durable and probably least intelligent of all the wild animals that inhabit the woods and fence rows of American farms; a Farm Home feature on how to make hooked rugs, and a little essay "When the Day's Work is Done," with an amateur's snapshot which turned out to be a masterpiece.

THE FARM QUARTERLY
22 East Twelfth St., Cincinnati 10, Ohio

R. J. McGinnis.....Editor
Fred Knoop.....Executive Editor
Grant Cannon.....Managing Editor
Joann Bell Pierce.....Associate Editor
Chas. R. Koch.....Associate Editor
Noel Martin.....Art Director
Betty K. Green.....Editorial Secretary
Aron M. Mathieu.....Business Manager

A TEXAS cowboy (above) parts company with his mount by mutual consent. THE COVER: The squeeze box is used as Ray Hander, the veterinarian, and Buddy Young give a bolet. The Bridwell Ranch values this heifer at $30,000.

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It makes sense to choose your tractor this way

Base your decision on *performance*—not talk.

To help you do this, Ferguson has devised the conclusive Showdown Demonstration. It is a *performance* test right on your own farm. It proves just how well the powerful Ferguson "30" will do most of your jobs—*more* of the time than any other tractor!

At your own Showdown Demonstration, you'll see the rugged Ferguson perform your toughest jobs without effort, your easier jobs without wasting power. You'll be able to compare the performance with that of your present equipment, or that of any other make you're considering.

So take this sensible step now . . . Call your Ferguson Dealer and arrange for your Showdown Demonstration of the powerful Ferguson "30". There's no obligation. You'll make your own decision about the best tractor for *you*—based on performance alone, not claims!

What you need to know about tractor buying! Ask your Ferguson Dealer for free copy of 24-page, fact-packed booklet, *How to Buy A Tractor*, or write: Harry Ferguson, Inc., Detroit 32, Michigan.

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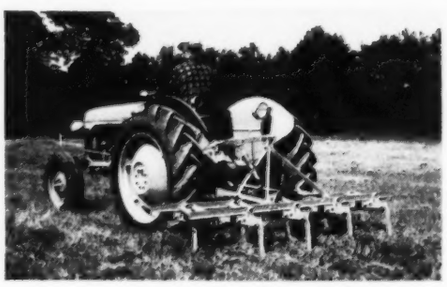


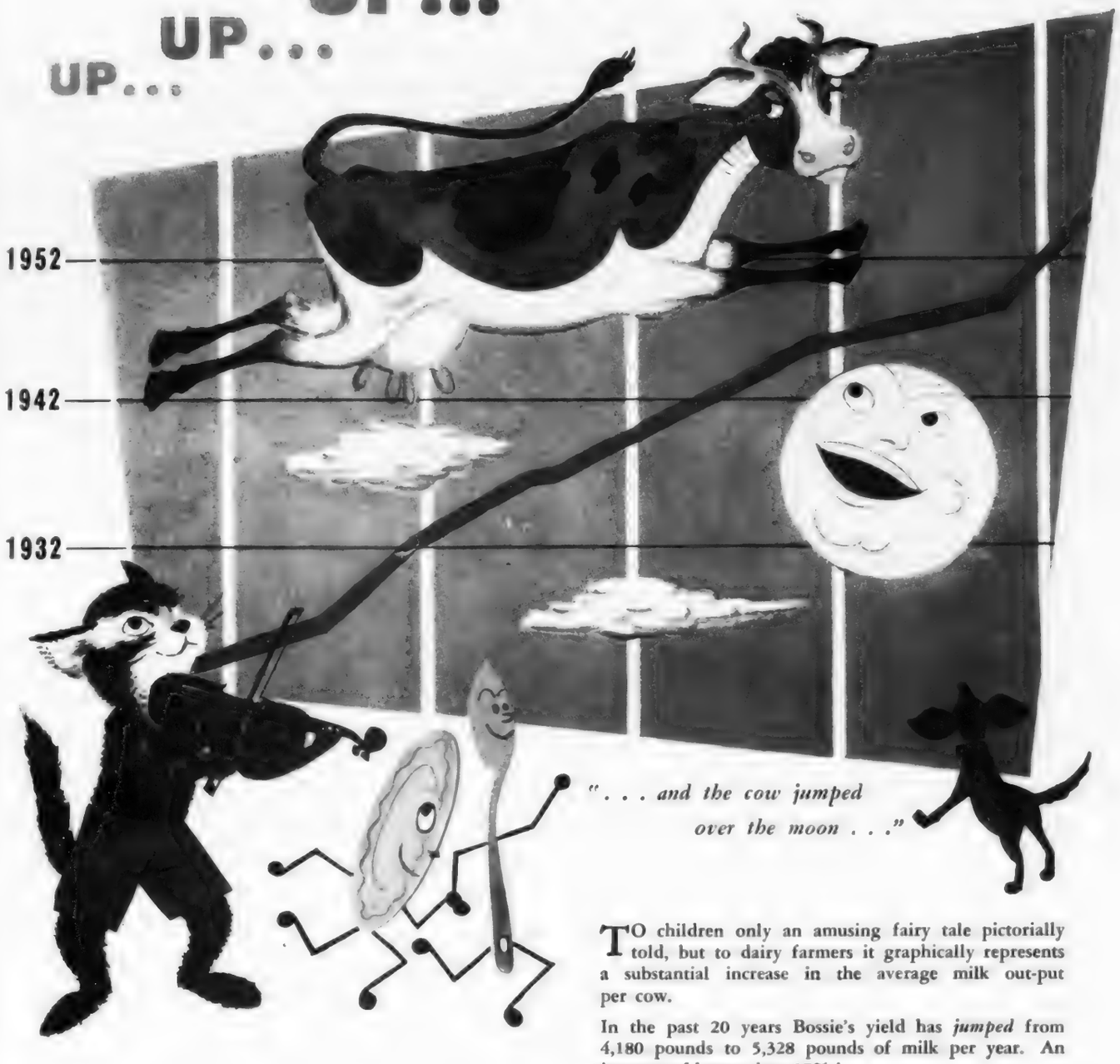
A Showdown Demonstration will show you remarkable new Ferguson developments, like the Tiller, for low-cost seedbed preparation. You'll also see how *convenient* the Ferguson is, with *fast* hook-up, *eyes-ahead* steering, and tractor-mounted implements!

No other tractor gives you the Ferguson System! That means traction without power-stealing weight, plus front-end stability, and a simple built-in hydraulic release that saves your tractor and implement if a hidden rock or stump is hit. Get *all* the facts about the Ferguson System at *your* Showdown!

Seeing is Believing—Get Your Showdown Demonstration of the

FERGUSON "30"

jumps milk production



". . . and the cow jumped over the moon . . ."

TO children only an amusing fairy tale pictorially told, but to dairy farmers it graphically represents a substantial increase in the average milk out-put per cow.

In the past 20 years Bossie's yield has *jumped* from 4,180 pounds to 5,328 pounds of milk per year. An increase of better than 27%!

This greater production is the result of continuous research in the field of breeding and feeding methods.

For example, Seagram alone has produced in the last ten years over a billion pounds of Seagram Dried Grains. This nutritious feed supplement is rich in proteins, minerals, B-vitamins and other important lactation factors.

Many feed dealers rely on Seagram Dried Grains to enrich their feeds, because rations balanced with Seagram Dried Grains, result in more milk on less pounds of feed.

Seagram

SERVICE TO AGRICULTURE

JOSEPH E. SEAGRAM & SON, INC.

Louisville 1, Kentucky

Genuine Surge TUG & PULL on YOUR Stanchion Pipe Line

A Stanchion Pipe Line is mighty handy . . . it takes the milk from the end of the cow's teat and delivers it to wherever you want it to go.

Any Stanchion Pipe Line runs into money . . . it will pay you well to protect your investment with a Surge built line—Surge Milk Valves . . . and . . . the Surge Surcingle Breaker Cup. Then you are sure of genuine Surge TUG & PULL that holds the teat cups down where they belong. Surge teat cups don't climb up and shut off the flow of milk so that the walls of the empty teat are banged together.

Whether you prefer a bucket or a parlor or a pipe line, the name plate "Surge" guarantees time proved TUG & PULL milking.

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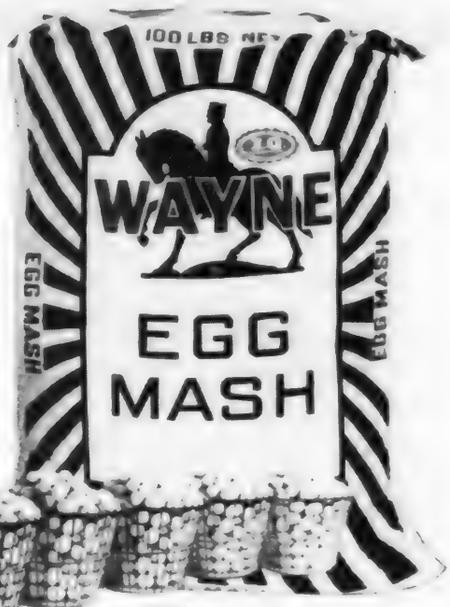
GET

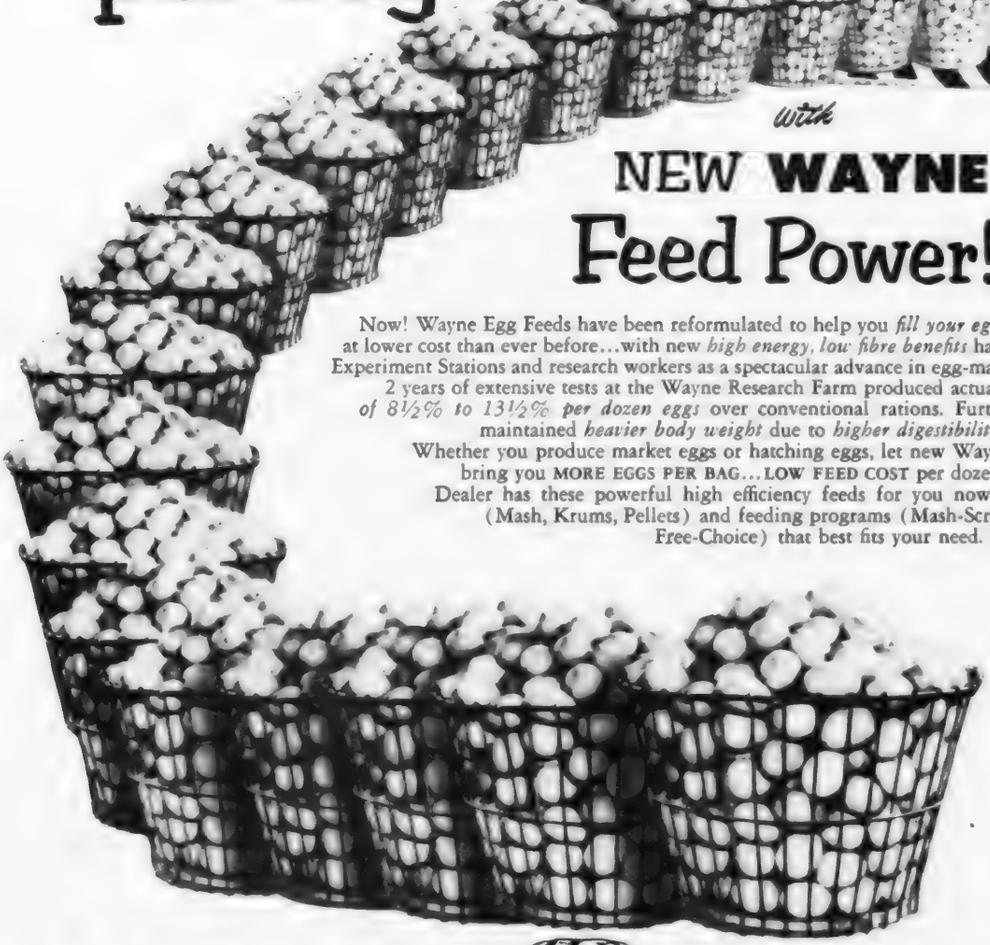
MORE EGGS per bag...



with

NEW **WAYNE** Feed Power!

Now! Wayne Egg Feeds have been reformulated to help you *fill your egg baskets* faster at lower cost than ever before...with new *high energy, low fibre benefits* hailed by leading Experiment Stations and research workers as a spectacular advance in egg-making nutrition. 2 years of extensive tests at the Wayne Research Farm produced actual *mash savings of 8½% to 13½% per dozen eggs* over conventional rations. Furthermore, birds maintained *heavier body weight* due to *higher digestibility* of the ration. Whether you produce market eggs or hatching eggs, let new Wayne Feed Power bring you MORE EGGS PER BAG...LOW FEED COST per dozen. Your Wayne Dealer has these powerful high efficiency feeds for you now...in the form (Mash, Krums, Pellets) and feeding programs (Mash-Scratch, All-Mash, Free-Choice) that best fits your need. See him today!



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ALLIED MILLS, INC., Builders of TOMORROW'S Feeds...TODAY!

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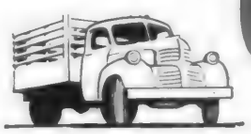
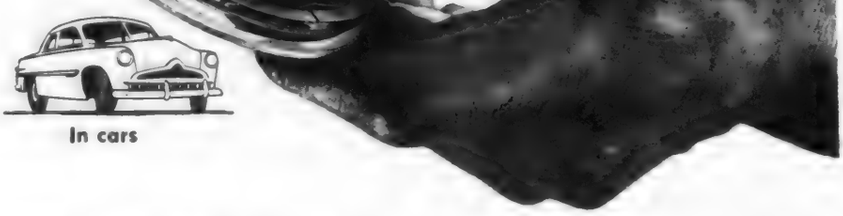
In tractors

sure cure for oil thirsty engines!



In trucks



In cars

Engineers know that the most important piston rings in an engine are the top compression rings. For they operate where heat is highest, where pressures are greatest, where lubrication is poorest . . .

That's why Perfect Circle's 2-in-1 Chrome Piston Ring Set provides a chrome-plated top compression ring as well as chrome-plated rails for the oil ring. This combination will seal compression and control oil for *over twice as long* as old-style rings . . . and, because 2-in-1 requires no tedious break-in period, normal engine operation is recommended immediately after installation!

No doubt about it . . . 2-in-1 is the truly modern piston ring set for cars, trucks and tractors alike! Get chrome protection at its best—with 2-in-1! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle **PISTON RINGS**

The Standard of Comparison

LETTERS

The Russian Story

Sirs:

Allow me to congratulate you and your associates on securing this article. It is the best of all the first-hand accounts of life on a Soviet collective farm I have ever seen or heard, and I have read and listened to a lot of them. In fact, it is so excellent that I would like to give it as prescribed reading to the 76 students of my Russian Area course.

I intend to place several copies of the magazine in the University library, on reserve, as a reading assignment to my students. In lecturing to them I will, of course, give due credit to THE FARM QUARTERLY for this superior job of digging up and presenting the article.

Albert Parry
Professor of Russian
Colgate University

Hamilton, New York

Green Grain Fields

Sirs:

As usual you have an outstanding number in Summer 1953. You may think I am presumptious to even mention this: your cover on the Summer issue is a natural with the exception that if this is a harvested grain field, which I am sure it is supposed to be, the ground should show yellow stubble, not green pasture. Maybe I am missing something on this cover picture and if I am I'd like to know it. . . . I as a boy worked in just such a field in northern Bavaria, some 40 miles from the present Iron Curtain. We cut our grain, rye, wheat, barley, and oats with a cradle, laid it by in windrows, turned it to dry, then used straw bands for binders, tied the bundles, put them in shocks, and eventually hauled them to the grain-barn where, during the long winter months, I helped flail many thousand of bundles of such grain.

But at no time, while bundles were in the field, was ground green.

Henry Teubel

Tulia, Texas

In Russia the shocked grain remains in the field until it is ready to be hauled to the threshing yard. If they were efficient that would be done a few days after reaping, but they have to wait until they can get a thresher. As a result, the grass which was sown with the wheat grows up around the sheaves.

Reader's Service

Sirs:

I have for rent on 50-50 basis, 1200 acres rich black crop land, 2500 acres mowed blue grass pasture. Houston County, East Texas, no drouth, plenty of labor at 40c to 60c per hour, houses modern, improvements excellent. No corn allotments; financing can be arranged, depending on the individual. John Grogan, Agent, Ambia, Indiana.

Notices such as the above will be published gratis when the character and financial responsibility of the principal is established with the editors.

Tenant-Landlord Relations

Sirs:

We are a young married couple from farm families and would like to farm for ourselves, but find it practically a financial impossibility under today's business conditions. Consequently, we have worked for several dairy farmers in this region and at the best find living conditions and working attitudes less than satisfactory.

That is, until just a year ago we fortunately came in contact with our present employer. My husband manages his farm which centers around a growing herd of Herefords and in-

class for class you get MORE POWER with ECONOMY in Massey-Harris Tractors

1-PLOW PONY — 62 cu. in. engine. 3 forward speeds, 2-way Depth-o-matic Hydraulic System.

2-PLOW COLT — 124 cu. in. engine, 4-forward speeds, 2-way follow-up Depth-o-matic Hydraulic System, 3-point hitch.

2-PLOW MUSTANG — 140 cu. in. engine (gasoline or distillate), 4-forward speeds, 2-way follow-up Depth-o-matic Hydraulic System, 3-point hitch.

3 PLOW 33 — 201 cu. in. engine, 5-forward speeds, 2-way Depth-o-matic Hydraulic System, Live P.T.O.

3-4 PLOW 44 — 260 cu. in. engine (gasoline, diesel, distillate, L.P.), 5-forward speeds, 2-way Depth-o-matic Hydraulic System, Live P.T.O.

4-5 PLOW 55 — 382 cu. in. engine (gasoline, diesel, distillate, L.P.), 4-forward speeds, Special Depth-o-matic Hydraulic System.

HERE'S power that makes every row or furrow seem shorter . . . that lets you run in a gear higher on jobs where other tractors have to dig in.

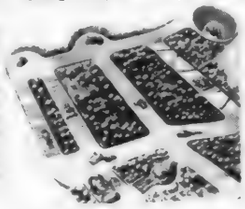
Try it yourself. Take a Massey-Harris through the tough ground. Give it the jobs that make your present tractor bear down and lug — and feel the Massey-Harris pull away with them.

Then compare the Massey-Harris to other tractors you've driven. Compare it for quick-responding power . . . for adaptable speeds, traction and hydraulic control — for all of the features you want in a tractor.

You'll find a Massey-Harris gives you the reserve power, the low-cost operation, the control, and adaptability you need to cut production and labor costs.

And you'll find Massey-Harris tractors mount big capacity tools that help you cover more acres on less fuel, in less time . . . that handle more jobs around your place with cost-reducing power.

See your Massey-Harris dealer for complete details. Ask for a demonstration. For free catalog write The Massey-Harris Company, Dept. J-222, Racine, Wis.

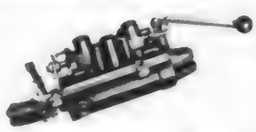


On this scientifically designed test track Massey-Harris engineers put machines through experimental runs that surpass anything they may undergo in the field — telescope into days, testing that otherwise might require a whole season. This thorough testing is one reason why Massey-Harris gives you so much more in performance, long life, and low operating costs.

Make it a Massey-Harris

Parts and Service through more than 2500 authorized dealers

Massey-Harris 4-cylinder engines are high torque, low friction design . . . lug better in the tough spots, recover quickly . . . cost less to run and maintain.



Depth-o-matic Hydraulic System gives smooth 2-way control of both mounted and pull-behind tools. Holds constant depth. Selective control and delayed action.

Power saving transmission design means more pulling power at the drawbar on less fuel. Precision cut gears, oil-bath lubrication, low maintenance.

Full-width, operator's platform, easy-to-reach controls, and Velvet Ride Seat help you finish the day fresher. Balanced hood design gives equal vision to both sides.

For dependable hydraulic power, make sure your tractors have..

Vickers Pump with hand adjustment to vary rate of oil flow as desired at normal engine speed. Pump is engine driven and hydraulic power is available with clutch disengaged.

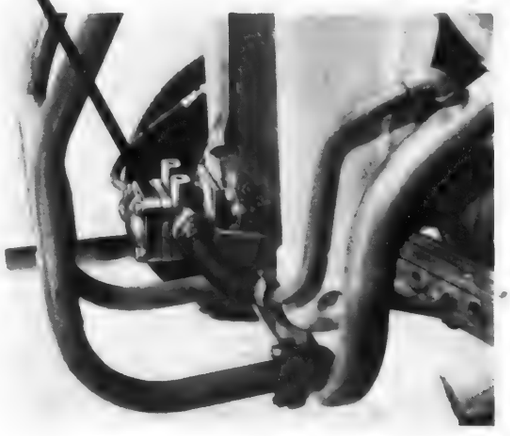
VICKERS HYDRAULIC PUMPS

Here you see how one of the leading manufacturers of farm tractors uses Vickers Pumps to provide dependable hydraulic power for implement control. These Vickers Pumps are vane type, hydraulically balanced and have automatic wear compensation. This means that they deliver more oil while taking less power from the engine . . . that they have a much longer life with minimum maintenance . . . and that they provide easier cold weather starting of the tractor.

The next time you buy a tractor, look for the Vickers Pump on the hydraulic system . . . it is the mark of a tractor that will do more and better work with less effort.

People who look for quality look to

VICKERS



Power for heavy-duty loader is supplied by this separate Vickers Pump mounted on front end drive (radiator grille removed.)

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1534 OAKMAN BLVD. • DETROIT 32, MICH.

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

6322

Application Engineering Offices: ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND DETROIT • HOUSTON • LOS ANGELES (Metropolitan) • NEW YORK (Metropolitan) • PHILADELPHIA PITTSBURGH • ROCHESTER • ROCKFORD • SEATTLE • TULSA • WASHINGTON • WORCESTER

cludes the usual crops found here in the Northeast.

If there were more employers like ours, there would be competent, willing, interested farm help staying on the same farm instead of the constant job-hopping, by looking for something better. I think the farm owners who need dependable help to run a profitable operation should invest a little money making tenant housing more livable and a little time cross-examining their attitudes—and not only toward the man, but including his family. I'm sure the harvest of this time and money would be well worth the sowing.

Mrs. Allen Fuller

DeRuyter, New York

Fitting and Showing

Sirs:

We thought your article titled, "Fitting and Showing" by C. Chester Charles, in the recent FARM QUARTERLY was very, very good. One from which anyone interested in the breeding or fitting of cattle can gain vital information. There is one thing about this article, however, which strikes this reader as rather odd and that is this.

Although Herman Purdy is quoted at length and it is mentioned that he "came home from the International Livestock Exposition last fall with the purple ribbon for showing the Grand Champion steer" nowhere was it mentioned that the Grand Champion was a Shorthorn.

While we are not asking for any addditional publicity beyond that given the other breeds, it is a fact that Shorthorns have won the International Steer Championship, four times in the past eight years.

N.A. Brown

Cambridge, Ohio

Our apologies to Mr. Brown and his fellow Shorthorn breeders. The article's reference to the Shorthorn apparently fell victim to the editor's shears in makeup. Assuredly the Shorthorn has an enviable record at all the big shows.

Truckers Must Be Smart

Sirs:

Your article "Milk Through a Hose" describes this method of handling quite well. My only criticism is that it does a better job of pointing out the advantages of the system than it does the disadvantages. For example it is necessary that the truck driver picking up bulk milk must be qualified to judge milk quality, to take a representative sample for fat test, and to record the amount of milk. With the can pickup method the major requirement of the hauler is to be able to withstand the rigors of handling the heavy cans of milk.

R. K. Waugh, Head
Dairy Husbandry Section
North Carolina State College

Raleigh, North Carolina

Urea and Vitamin A

Sirs:

Under practical conditions animals obtain their vitamin A from many sources. For this reason I feel the statement concerning the effect of urea on the destruction of vitamin A in fish oil, made on page 96 of the Spring issue, needs clarification.

There are no reports that urea destroys or kills vitamin A activity in *all* stored feeds or under *all* conditions, as is implied in this statement. Likewise, to the best of my knowledge, there are no reports to indicate that urea destroys vitamin A activity in the rumen after urea-containing feed has been eaten. These remarks should apply to both high potency fish oils and dry A preparations alike. It is realized that the stability of vitamin A in stored feeds can be a problem and in one research report there was an indication that urea hastened the destruction of a carotene—a vitamin A precursor. Further work is needed for the clarification of this rather complex problem.

Orville G. Bentley

Wooster, Ohio

ROCK PAYS WELL! *"First-year profits paid us $4.77 for each $1. invested in AA QUALITY Phosphate Rock and this one application will pay dividends 5 or 6 years more," say SMUCKER BROTHERS—see letter, at left.*

"This was the first time we used AA QUALITY Ground Phosphate Rock and it's paying out well," says J. S. SMUCKER, Bird-in-Hand, Lancaster Co., Pa., shown with his brothers, PAUL M. and MARK G. and ELMER S. GLICK, left to right, in photo, at right, taken Oct. 1, '52, examining knee-high alfalfa after 3 cuttings had been made. Adds Mr. Smucker:

"Seeded in Fall '50, with 500 lbs. 0-14-7 per acre as a starter, this field made a spotty, weedy stand. Soil tests showed phosphorus deficiency, so we applied AA QUALITY Ground Phosphate Rock, 1,000 lbs. per acre in '51. The stand soon improved, crowding out weeds, and in '52 we cut 5 tons high-quality alfalfa per acre—1½ tons MORE per acre than from our nearby fields without Rock.

"Rock costing $11. per acre spread on the field gave us $52.50 MORE alfalfa per acre, or $4.77 return from each $1. invested, and this one application will pay dividends for 5 or 6 years more. We're applying 2,000 lbs. Rock per acre ahead of all our alfalfa hereafter!"

Try Phosphate Rock on Your Farm THIS FALL

IT IS generally recognized that the average soil is *still too low in available phosphorus* to produce maximum yields of quality crops. Year after year, due to more intensive cultivation and the use of new, high-yielding varieties of crops, *more phosphorus* is being sold off the farm in the crops, meat and milk than is being replaced through the usual application of superphosphate and mixed fertilizers.

Good seed contains its own supply of phosphorus for germination. But from there on, any deficiency in the soil's supply of available phosphorus retards growth and also prevents the young plant from utilizing the other plant foods necessary for full yield and quality.

The economical way to rebuild and maintain an adequate supply of available phosphorus is through the use of liberal applications, 1000 to 2000 lbs. per acre, of low-cost ground Phosphate Rock, spread and disced-in deeply at the beginning of each rotation.

Crop results show that an application of phosphate rock generally pays a good profit the first year—and in addition, continues to pay dividends each year in better crops throughout the rotation, as the phosphorus in the rock is being continuously converted by action of the natural soil and plant acids and released in a soluble form which plants can use.

Even though the surface soils have been well limed, the sub-surface layers usually remain on the acid side, and in this area, your soil, in effect, becomes an acidulating plant manufacturing readily available phosphorus as long as the application of the rock lasts.

Fall Is Logical Time to Start

You can apply ground phosphate rock anytime you can get on your land. A good time to start is NOW. Apply AA Quality Ground Phosphate Rock ahead of the Fall-seeded legumes and on wheat land to be seeded to legume-grass. Legumes are heavy feeders of phosphorus and have a particular ability to make efficient use of the phosphorus in a Rock application.

You will get best results by spreading the rock well in advance of planting and working it in deeply, below the plow-surface layer of soil. Properly placed, the rock will encourage deeper root growth, build a better soil by increasing the supply of organic matter and nitrogen, increase moisture-holding capacity—and insure a continuing supply of available phosphorus for the crops to draw on as needed.

Ground Phosphate Rock should be considered as a supplement to—*not as a substitute for*—your regular fertilizer application. This additional supply of phosphorus *pays its own way* and usually increases the return on the investment in the customary applications of superphosphate or mixed fertilizers applied to feed the crops in the rotation.

Write For Free Booklets

Try it on your own farm as an addition to your regular fertilizer program and see for yourself how an application of Rock can make more money for you. We'll be glad to test your soil, at no cost or obligation to you, and give you recommendations as to how and where you can improve your whole rotation fertilizer program. Drop a card to nearest office listed below or see your nearby AAC Fertilizer Dealer.

The American Agricultural Chemical Company, one of the world's oldest and largest producers of Phosphate Rock, Superphosphate, Agrico® and AA Quality® Fertilizers, offers you AA Quality Ground Phosphate Rock *at most economical prices.* Write for helpful free booklets today.

The AMERICAN AGRICULTURAL CHEMICAL Co.

Alexandria, Va.	Henderson, N. C.
Baltimore 24	Houlton, Maine
Buffalo 6	Laurel, Miss.
Carteret, N. J.	Montgomery 2
Charleston, S. C.	Norfolk 6, Va.
Cincinnati 17	No. Weymouth, Mass.
Cleveland 11	Pensacola Fla.
Clinton, Iowa	Pierce, Fla.
Columbia, S. C.	Savannah, Ga.
Detroit 31	Spartanburg, S. C.
East St. Louis, Ill.	Phoenix, N. Y.
Greensboro, N. C.	

These farmers know that phosphate rock pays good dividends!

INDIANA: "I'd been getting poor, spotty sweet clover stands, so in Spring '50 applied 1150 lbs. Rock per acre on a 12-acre field, worked it down, and seeded to oats and sweet clover, fertilizing with 200 lbs. 0-14-7 per acre at seeding. In May '51 the clover was waist-high, a perfect stand. I plowed the field and planted corn, and in a wet season, got 11 bu. MORE corn per acre than the best previous yield on this field. In '52, a dry year, soybeans planted in this field, fertilized with 200 lbs. 0-12-12 per acre in the row, yielded 35 bu. per acre. Rock pays dividends throughout the rotation."

—LERLAND FOGWELL, Ft. Wayne.

MISSOURI: "For 3 successive years, I seeded red clover on a 20-acre field and each year had a complete failure. Corn wasn't much better, only 30 bu. per acre. In Winter '50-51, I spread 1000 lbs. Rock per acre and in Spring '51 seeded to oats, red clover and timothy, fertilizing with 4-12-4 at seeding. I got 40 bu. oats per acre, and that Summer baled 1½ tons hay per acre. In '52 I baled 3 tons of hay per acre, worth $35 a ton, and combined 1¼ bu. red clover seed per acre, worth $23 a bu. Rock, costing $9.50 per acre, paid me $133.75 per acre in hay and seed in '52 alone. My entire 610-acre farm is getting an application of Rock!"

—HAROLD GIBSON, Hamilton

VIRGINIA: "As my soil was low in phosphorus, I applied 2000 lbs. Rock per acre to a soybean field, fertilizing with 2-12-12, 300 lbs. per acre, as usual when planting. Yield checks show that Rock increased the yield by 7½ bu. MORE beans per acre. This repaid the cost of the Rock, plus $4.38 per acre besides, and 4 or 5 following crops will benefit from this Rock application. I plan to use Rock as a part of my regular fertilizer program—it pays!"

—W. P. GRIMSTEAD, 112 Giles Circle, Norfolk.

FLORIDA: "I began improving acid muck soils 10 years ago by applying Phosphate Rock, a ton per acre. What was weeds and native grasses is now good-quality carpet grass, high in minerals and pleasing to the cattle. Before applying Rock, top calves averaged 287 lbs. each. Now the entire crop averages better than 400 lbs. each. Our calf crop has increased from 60% to 85%, with stronger bodies and improved bone structure, and calves now bring top prices each year. This shows that brood cows are stronger, thriftier, and better milk producers."

—P. E. WILLIAMS, Crescent Valley Ranch, Davenport

FROM OUR MINES TO YOUR FARM

FOR REAL ECONOMY, USE

AA Quality Phosphate Rock

FINELY-GROUND FLORIDA PEBBLE PHOSPHATE ROCK

Prove to yourself how STONEMO GRIT *reduces feeding costs!*

MAKE THIS SIMPLE TEST

Divide your flock. Take ½ of them —give them your regular care and feed — without using STONEMO Granite Grit.

Take the other ½ — but include STONEMO Granite Grit in the feeding program, according to directions, right from the start.

Then compare! See what a difference STONEMO Granite Grit makes in increased weight through better use of feed—and in less cost of feed per pound of meat or per dozen eggs.

Read what these poultrymen say about extra profits

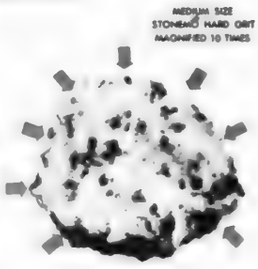
A. P. LOOMIS
Honeggers' & Co., Forrest, Illinois
"Our Honegger Leghorns have it (Stonemo) before them just as systematically as their feed and water supply, and it is always part of our poultry program recommendations to our many customers."

JOHN G. TOWNSEND, Jr.
Townsends, Inc., Millsboro, Delaware
"Your Stonemo Grit fills our every requirement ... allows nutrients in our feed to be readily assimilated, giving us faster growth and more poultry profits."

PERRY BROWNING
Browning Turkey Farm, Winchester, Ky.
"We grow some 80,000 turkeys annually. We know from experience that Stonemo Grit improves feed conversion."

STONE MOUNTAIN GRIT COMPANY, INC. DEPT. FQ-F
Executive Offices and Quarry: LITHONIA, GEORGIA
Branch Quarry: BARRE, VERMONT

STONEMO



The Grit with the EXTRA GRINDING SURFACES

Poultry Yard

Cholera in Poultry Fowl cholera—no relation to hog cholera—hits chickens and turkeys particularly hard during cold weather. An acute case may cause death within three days, but chronic cases have been known to linger for months. Birds sometimes die so quickly and with so few symptoms, poultrymen have thought they were up against a case of poisoning.

The disease is caused by a bacterium, *Pasteurella avicida,* which poisons the blood of the affected bird. The disease is spread from infected premises to healthy flocks by wild birds, poultry, animals, dirty equipment, and, of course, man. Man, however, cannot catch the disease.

Some of the symptoms of cholera are: going off feed, thirst, droopy appearance, difficult breathing, swollen wattles which turn a bluish red, reddened skin, soreness of legs, a paralyzed crop, diarrhea with greenish or yellowish droppings. An autopsy shows yellowish or red areas on the liver which is sometimes enlarged, hemorrhagic spots on the heart and in the intestines, congested lungs, swollen spleen, sticky fluid in the mouth and nostrils. Not all birds will show all of these symptoms and some of these symptoms are similar to those which go with other diseases such as limberneck or rickets.

Sanitation is the best weapon against the disease. Diseased birds should be destroyed and their carcasses, droppings, and litter burned. If a bird shows a temperature over 107.5 degree Fahrenheit, assume it has cholera and dispose of it.

For the prevention of cholera, sulfaquinoxaline is given continuously in the drinking water at the rate or 1 to 10,000. Sulfamerzine in the mash at the rate of 0.5 per cent is helpful in reducing the mortality in turkeys.

Automatic Light Switch When should lights be turned on to increase egg production? O. F. Smith, of Hagerstown, Indiana, has an answer which is so simple it is almost startling. He believes the lights should be on any time when it is dark between five in the morning until eight at night. And by dark he means cloudy, gloomy daylight hours as well as before and after the sun is shining. An electric eye on the shady side of the house keeps an unblinking watch on light conditions during the whole year. When an electric clock turns on the lighting system at five in the morning the eye takes up its vigil and keeps the coops cheerfully lighted through the day. When the sun is out, the coop lights are out, too, but a cloud covering the sun will cause the eye to turn on the lights.

New CASE Mounted "Drive-In" Picker

ONE AND TWO-ROW MODELS

Two-row picker is built to utilize the power of the Case "DC" 3-plow Tractor . . . one-row mounts on Case low-cost "VAC." Both pickers are easily controlled from tractor seat . . . provide good visibility.

● You drive tractor into picker slowly . . . engage hydraulic lift arms while guiding picker drive shafts into funnel sockets without leaving seat . . . and you're ready to pick corn. It's that simple, quick, and easy to mount the new Case "Drive-In" Corn Picker in just a few minutes . . . or free tractor for plowing, other urgent fall work. Has straight-through ear-travel design, big capacity. Twin elevators on two-row model keep ears moving fast.

One-Man, Two-Row Picker-Sheller

Picks and shells up to 1,200 bushels per day . . . or one man can pick, husk, shell, clean, and haul 600 bushels of corn ready for market or drier in a day. Helps you get the job done alone when help is scarce. Handles high-yielding hybrid corn easily . . . with sturdy gathering chains . . . combination picking-husking rolls . . . heavy, revolving beaters for shelling . . . powerful cleaning fan to blow out silks, trash . . . elevator to move corn to bin or special wagon loader.

PULL-TYPE PICKERS FOR ANY CORNFIELD

Fit any tractor . . . can't be beat for fast, clean harvest. Both one-row and two-row models pick ears from down as well as standing corn. Continuous contact of combination picking-husking rolls reduces shelling, improves husking. Entire machine "floats" . . . has adjustable axles to provide settings for maximum clearance . . . PTO drive . . . safety clutches.

SEE YOUR CASE DEALER about the size and type of corn picker to fit your needs, your tractor . . . to put you ahead in time gained, crop saved, and harvesting expense kept down.

SEND FOR CORN MACHINE CATALOGS

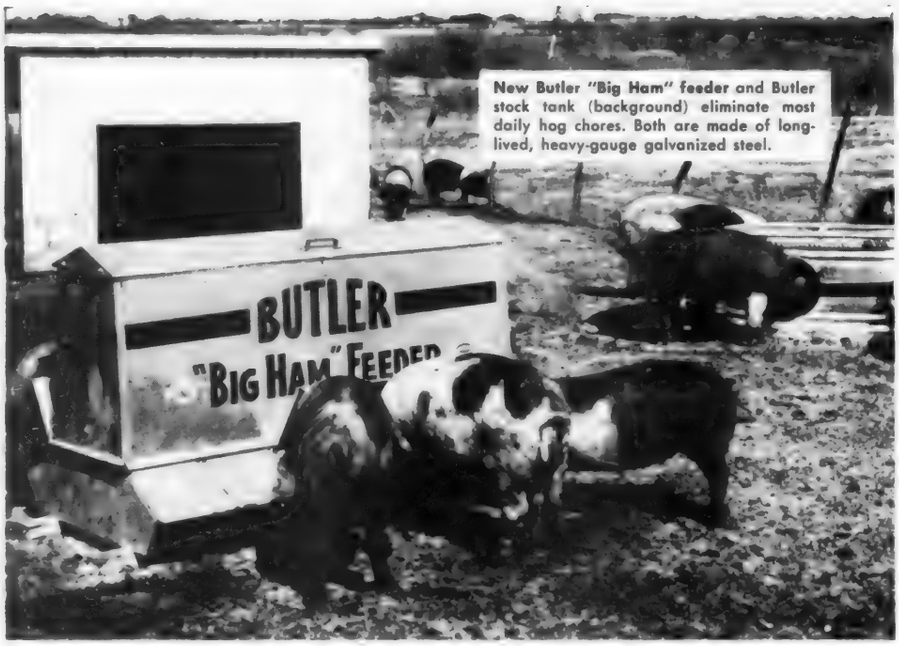
Just mark here or write in margin any model of corn harvesting machine that interests you . . . or any size of tractor or implement. Address J. I. Case Co., Dept. J-90, Racine, Wis.

- ☐ "Drive-In" Front-Mounted Picker
- ☐ One or Two-Row Pull-Type Picker
- ☐ 2-row Picker-Sheller
- ☐ Heavy-Duty Elevator

Name_____

Postoffice_____

RFD_____ State_____



New Butler "Big Ham" feeder and Butler stock tank (background) eliminate most daily hog chores. Both are made of long-lived, heavy-gauge galvanized steel.

You can save feed...

Cut chore time with new

BUTLER "Big Ham" Feeder

You can fill this new, heavy-duty Butler "Big Ham" with a supply of feed . . . and forget the daily drudgery of carrying feed to your hogs! Its big, weather-tight, galvanized steel hopper makes it easy to keep a fresh, clean ration before your hogs constantly for fast, thrifty gains. And with a choice of 4, 8, 12 and 16-lid sizes, you can feed from 20 to 80 hogs with only *one* "Big Ham" feeder!

See your Butler dealer. He'll show you the new Butler "Big Ham" hog feeder, also full line of Butler stock tanks with hog fountain.

Send coupon for name of your nearest Butler Blue Ribbon dealer, also free folders on the new "Big Ham" feeder and Butler stock tanks.

Compare Butler's construction with other feeders you've seen

1. **Armored for abuse** — 20-gauge galvanized steel body, reinforced for big hogs.
2. **Full-depth partitions**—Prevent mixing of different feeds and supplements.
3. **Dependable agitators**—Activated by hogs to keep feed from bridging in hopper.
4. **Adjustable feed regulators**—Let you set feed flow quickly, even when full of feed.
5. **Sturdy skids**—Equipped with clevises for fast hitching and easy moving of feeder.
6. **Replaceable parts**—Bolted construction makes replacement of parts simple, economical.

For prompt reply, address office nearest you:
BUTLER MANUFACTURING COMPANY
7378 East 13th St., Kansas City 26, Missouri
978A Sixth Ave., S.E., Minneapolis 14, Minnesota
921 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 78A, Richmond, California

Please send me the name of my nearest Butler dealer, also more details on Butler Blue Ribbon hog equipment.

Name .....

P. O. .....

R. F. D. ..... State .....

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Birmingham, Ala. — Richmond, Calif.
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BUTLER
STEEL PRODUCTS
OIL EQUIPMENT — STEEL BUILDINGS
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SPECIAL PRODUCTS

The Dairy Barn

The Iceman Cometh Calves from frozen semen—the revolutionary dream of artificial insemination scientists—became a reality in America on May 29, 1953, when a heifer calf was dropped by a Holstein cow on the farm of Melford Hill in Janesville, Wisconsin. The calf appeared normal in every way and seemed quite unconcerned that it was the iceman rather than the postman who brought her. The semen was produced and frozen by the Wisconsin Scientific Breeding Institute of Madison, Wisconsin, where experimenting was started in this new, exciting field shortly after the British announced that they had found a buffer material, glycerol, which made it possible to freeze semen.

This buffer material protects tthe sperm from the formation of heavy ice crystals. Even with the glycerol, the freezing process must be very carefully controlled through the range of temperature from 40 degrees above to 110 degrees below zero Fahrenheit. The semen is packed in individual ampules and then cooled and frozen by immersing the ampules in alcohol which is cooled with dry ice. The frozen semen is stored in dry ice refrigerators at 110 degrees below zero. In Wisconsin they have stored semen for as long as four months without apparent injury to the sperm; in England, cows have been impregnated with semen a year old.

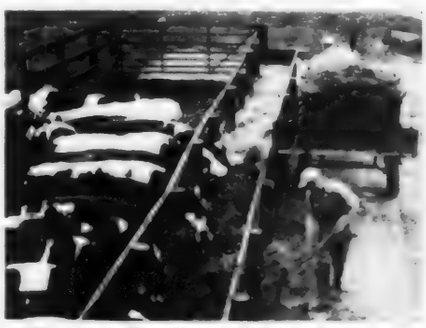
The effect of this new discovery on the dairy industry will be even greater than the first effects of artificial insemination itself. Bulls will be able to produce 100,000 calves if their semen is frozen and held until needed rather than used or thrown away (and three-quarters of it must be thrown away) as it is now. Bulls will also be able to go on producing calves long after they, themselves, have died. Breeders will be able to carry out planned breeding programs whether or not the stud had collected semen from that particular bull the day they had to breed their cow —or, for that matter, whether or not the bull was still alive.

The technique of semen freezing will reduce the number and increase the quality of the bulls needed for dairy breeding. It will be possible to carry on a program of bull testing without regard for the time expended, for the production of semen of the tested bull will go right on and will be held in a semen bank until a complete test can be made on him.

The Wisconsin Scientific Breeding Institute is only one of many artificial breeding associations working on this problem. From now on calves produced by this method should be dropping like blossoms from a frost-bitten peach tree.

Silage Feeding Without Pain

Cutting delivery time on a load of grass silage from a half hour to three minutes from pit silo into feed bunk has been accomplished by Dick Logan on his Morrow County, Ohio, dairy farm. Logan, whose mechanical aptitude makes him a valuable partner for his father and brothers, took the bed from an old horse-drawn manure spreader, mounted it on a two-wheel trailer, and powered it from the power take-off of the tractor. Two old automobile transmissions were mounted within reach of the tractor seat; one runs the web that dumps the ensilage, the second is used to propel a cross-conveyor that carries the ensilage sideways into the bunks. This cross-conveyor floats on extensions of the old spreader frame so that it can be pushed from side to side and reach out to bunks on either side of the spreader through it is no wider than the wheel width of the spreader itself. Side movement of the cross-conveyor is made possible by a universal joint connecting the drive shaft. Using the transmission in forward or reverse makes it possible to deliver feed to one side or the other.



LOGAN and his self-unloading wagon.

Logan claims it takes just as long to climb into an upright silo and throw down seven baskets full of silage for the calves as it takes to load the spreader from the pit silo with an electric elevator and feed their 50 head of cows.

For those not so mechanically inclined, several manufacturers have put some very efficient silage unloading wagons on the market.

River of Milk

A statistically minded young man—one who probably knows how many shoe-buttons it would take to cover the State of Idaho or how many paper-clips linked together would reach from here to Mars—has estimated that each year the dairy farmers in the United States produce enough milk to fill a river 3,000 miles long, 40 feet wide, and 3 feet deep. This chap, who is with the Milk Producers Federation of Cleveland, points out that at the present time, about two per cent of this river, or the top seven-tenths of an inch, is surplus and is piped off by the government at a cost of $132,000,000 a year—a figure, he is quick to point out, which is considerably less than a third the cost of either wheat or cotton support.

Wide doors on new Butler building let you move 4-row equipment and big implements in and out with ease!

Now you can Build for less with this *New* BUTLER building

...get 20′ doors, 36′ clear-span interior

You can make your building dollars go farther than ever with this new all-purpose Butler steel building. And get the weather-tight, easy-to-use space you need for livestock housing, machine and feed storage. This new building gives you a 36′ wide clear-span interior with 12′ sidewalls and 20′ sections for any length building you want. Big 20′ doors can be located in sides and ends for your convenience. Bolted construction speeds erection, cuts later expansion costs. What's more, Butler rigid frame and galvanized sheeting assure years of dependable service with little upkeep!

"Most adaptable building I've used"

. . . Says Foster Adams

Manager of the farm where the new Butler building was tested.

"We can take any machine on the farm through those 20′ Butler doors," says Mr. Adams. "The new building is just the thing for machine storage. Right for livestock, too! It's weather-tight, easy to partition, simple to clean . . . It's the most adaptable building I've ever used!"

See your Butler building dealer right away! He'll show you how you can build for less—get more usable space per dollar—with this new Butler building. Send coupon for name of your nearest dealer and free folders by mail.

KANSAS CITY, MO.
Birmingham, Ala. — Richmond, Calif.
Galesburg, Ill. — Minneapolis, Minn.

BUTLER STEEL PRODUCTS

OIL EQUIPMENT — STEEL BUILDINGS
FARM EQUIPMENT — CLEANERS EQUIPMENT
SPECIAL PRODUCTS

For prompt reply, address office nearest you:

BUTLER MANUFACTURING COMPANY
7378 East 13th Street, Kansas City 26, Missouri
978A Sixth Avenue, S. E., Minneapolis 14, Minnesota
921 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 78A, Richmond, California.

Please send me the name of my nearest Butler building dealer, also more information on the new building for use as

Name .....
Town .....
County ..... State .....

DOW

YOU CAN'T BEAT PENTA-TREATED POLE BUILDINGS FOR LOW UPKEEP

PENTA, a clean wood preservative, controls both decay and termites, saves labor and cuts replacement costs in half

The Dow Chemical Company
Dept. PE 3-5C2, Midland, Michigan

Please send free of cost the information checked below:

_____Booklet, "Before You Build Your Barn".

_____Tell me where to buy clean PENTA-treated poles.

_____Tell me where to buy clean PENTA-treated posts.

Name_____

Address_____

City_____State_____

Treated with *clean* PENTA*, the popular pole-type farm building becomes more than just a good buy—*it becomes a sound long-term investment, requiring a minimum of repair and upkeep.* Plus long life, PENTA gives wood a *clean* treatment. This important feature saves construction time by making the wood pleasant and easy to handle, and *clean* PENTA-treated poles and fence posts are an asset to the appearance of any farm.

PENTA keeps *all* the wood in pole structures strong and serviceable for many extra years by controlling both decay and termites. This means big savings in labor as well as in replacement materials. It will pay you to investigate PENTA-treated pole construction for your next new building—it will save you money for many years to come.

You can safeguard your investment in fencing, too, by using PENTA-treated posts—they last from 2 to 4 times longer than untreated posts.

Write Dow today for complete information about *clean* *PENTAchlorophenol and its many applications on the farm. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS DOW

Model 80 wire-tie—If you store or ship hay, bale straw for the commercial market, or just plain like wire-tied bales, see the "80". It packages up to 100 tons a day. Exclusive twist lies flat on the bale.

Model 77 twine-tie—the baler you'll see on more farms than any other make. Packages up to 10 tons of hay an hour . . . ties thousands of bales without a miss. It's the favorite of custom operators and farmers who must have highest baling capacity and complete reliability.

Now you can choose from

3 great New Holland balers!

The *sensational* Model 66 twine-tie Newest addition to a famous line... Costs hundreds of dollars less—makes hay baling practical on almost any farm!

Now, no matter what you bale or where you bale it . . . no matter whether you feed, sell or custom bale . . . you can pick a New Holland to fit *your* job. For New Holland's "66" now joins the famous "77" twine-tie and the mighty "80" wire-tie.

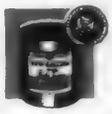
This gives you a complete choice of balers—priced from $1665!*

In price, size, the compact "66" beats all other self-powered, square-bale, pick-up balers . . . and will package up to 6 bales a minute, up to *7 tons of hay an hour!*

With speed like this you can bale all your hay just at the right stage of curing. Your stock gets up to 50% higher feed value . . . you keep more of your farm profits.

Ask your authorized New Holland Dealer to demonstrate, on your own farm, any one of the 3 great New Holland balers. Or mail coupon. The New Holland Machine Company, a subsidiary of The Sperry Corporation.

*Suggested list price F.O.B. New Holland, Pa., for Model 66, not including Federal Excise Tax on tubes and tires.



Get what you pay for—buy the best! New Holland is the only Twine certified by the U. S. Testing Co. to meet rigid standards of length, quality and strength. For wire, choose New Holland, too.

NEW HOLLAND

"First in Grassland Farming"

Free Catalog Illustrated catalogs give complete details. Write: New Holland Machine Company, 909 Cedar St., New Holland, Pa.

Name_____

Street or RFD_____

Town_____ State_____

Check Model interested in: ☐ Model 66 ☐ Model 77 ☐ Model 80. I would like free demonstration on my farm. ☐

New Holland, Pa. • Minneapolis • Des Moines • Kansas City • Brantford, Ontario

An Eaton 2-Speed Axle

Makes Tough Hauling Easy"

... says Claud W. Hoover, rancher, Medford, Oregon

IT'S SOFT UNDER FOOT—but this Eaton-equipped Ford gets in and out without a holdup. This is one of the operations on the Hoover ranch—building an "outdoor silo" in which cull pears from local canneries are mixed with hay for cattle feed.

"A GREAT GAS-SAVER," says Mr. Hoover. "When we're out of the fields and on the highway, we have a lot of tough hills to climb. With the Eaton 2-Speed Axle we climb faster—save a lot of time because of the extra gear ratios."

"On our ranch, a truck has to go everywhere, off the road as well as on," says Claud W. Hoover, Oregon rancher. "And we've never seen the time we couldn't get through with the Eaton Axle, regardless of ground conditions.

"An Eaton 2-Speed Axle truck moves—anywhere. Those low-range gears have the pull to keep trucks going, keep us from getting stuck when hauling heavy loads over loose, soft or muddy soil.

"One of our big jobs is hauling cattle, sheep, grain and other farm products as far as 400 miles—with a lot of tough climbing on mountain roads. The Eaton 2-Speed allows us to climb hills faster and make better speed on the level stretches. On highway runs, Eaton's high-gear range not only enables us to make better time, but also saves us plenty in gasoline and repair costs by cutting down engine RPM considerably."

An Eaton 2-Speed Axle adds to any farm truck's efficiency—and reduces upkeep cost. An Eaton-equipped truck is easier to handle, more economical to operate and a better all-round performer. Ask your truck dealer to demonstrate how an Eaton Axle can save you time, trouble and dollars.

FORD DEALER HUGH H. COLEMAN *(right)* **AND FORD OWNER CLAUD W. HOOVER.** Says Mr. Coleman, "More than seventy per cent of the Fords we sell are equipped with the Eaton 2-Speed Axle. Eaton 2-Speeds stand up on the toughest jobs—they're trouble-free."

MORE THAN 1½ MILLION EATON AXLES IN TRUCKS TODAY

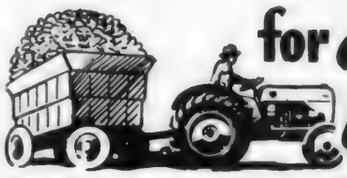
EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED *Truck* AXLES

P.A.R.

PROJECT ADEQUATE ROADS: Speak up for the better roads America needs. You will help lower the cost of getting farm products to market.



for Bigger Better Crops

Test Your Soil NOW

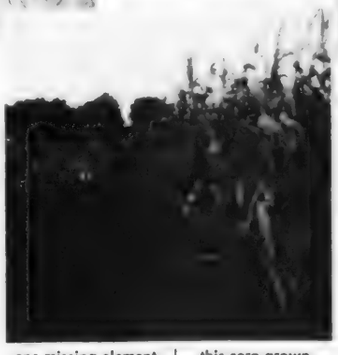
Soil Can Make —or Break You!

Without the right plant foods in the soil, even the best farming cannot prevent stunted, deformed ears and weak stalks that lodge. A leading Agricultural Experiment Station made these tests to prove the benefit of using proper fertilizer.

The stalk at left, from the field not properly fed, was cut down the center to show that joints as well as roots had rotted, causing both poor yield and difficult harvesting.

It also robbed the soil of fertility a good healthy crop would have returned.

The tremendous root system, sound stalk and perfect ear at right was grown in a comparison plot where correct kinds and amounts of fertilizer were used.



one missing element caused this failure | this corn grown on balanced soil

Astounding Proof

In this field scene, see the benefits of soil testing and right use of fertilizer. Just one change in the fertilizer formula used in rows at left produced the thick, heavy fodder and large perfect ears in rows at right.

These benefits on corn apply equally to every crop you grow on your farm. Don't miss the bigger crops gained by owning a **Sudbury Soil Test Kit!**

Farmers deLuxe Soil Test Kit

Complete with everything you need for hundreds of tests. More valuable to you than all your stock and tools! Shows the right amounts of nitrogen, phosphate and potash for each field. Also shows whether lime is needed (pH) and how much. Lifetime welded steel chest, carrying handle, weighs only 12½ lbs. Easy instructions and charts show needs of 225 different crops. **Big value, only $29.95.**

Over 400,000 Now In Use

Their letters in our files read like this: "I have made many tests; like its simplicity and accuracy." —G. H., Ohio. "The Kit has paid for itself over and over again. Saved $400 on fertilizer."—W. L. D., Pa. "Increased bean yield 50% after correcting phosphate deficiencies."—A. F. B., Iowa.

Also sold on Easy Payments if desired—see bottom of coupon.

Hardware, Seed, Grain and Farm Supply Stores: Serve Your Customers by Carrying This Essential Aid to Better Farming—**Write for Special Offer.**

SUDBURY Soil Test Kits

SUDBURY LABORATORY, Box 936, South Sudbury, Mass.

World's Largest Makers of Soil Testing Equipment

Fall is the Most Profitable Time To Make These Easy Tests

Now is the best time to find out what your soil needs to produce bumper crops in every field! You can see how much fertility this year's crops took out of the soil, and know in advance the right kinds and amounts of fertilizer to buy this winter and next spring. Also, there's still time to correctly fertilize crops put in this fall.

The way to maintain and increase your farm income is to get more bushels or tons per acre. All over the country progressive farmers are doing this by soil testing. Experiment Stations have proved tremendous increases are possible by using the right fertilizers. The Under Secretary of Agriculture said recently: "To meet the cost-price squeeze, farmers must get higher yields per acre and greater production per animal. That means spending wisely to maintain and expand production." It's even highly profitable to test and fertilize meadows and pastures.

The only way to get proper fertilizers with the right amounts of nitrogen, phosphate and potash for each crop you want to grow is to test the soil. Crop experts say the average yield of American farms can easily be doubled within a few years. Wouldn't you like to achieve such record yields as 227 bu. corn per acre, 125 bu. oats, 30 tons tomatoes, 906 bu. potatoes, 5 tons hay—and increase milk production as much as 300%?

Make Every Acre Earn More Money

Your prosperity depends on the soil. You'll produce record yields the very next season, and build up your soil for years to come, instead of draining its vitality. In two weeks your **Sudbury Soil Test Kit** will have paid for itself many times over!

You not only make more money, you save money—every season you'll save up to $15 an acre on fertilizer. Guessing wastes both time and money—like the farmer in Illinois who "guessed" he needed to spend $500 for lime but tests showed he didn't, and that $500 paid for all phosphate he found was really needed on 65 acres.

No Knowledge of Chemistry Needed

EASY AS READING A THERMOMETER

So simple anyone can use it. Even your first tests will be accurate and reliable. No waiting for reports—you get the correct answer right away. Ready to use anytime, anywhere. Takes only 10 minutes, costs less than 10c a test.

Agricultural Colleges, County Agents, Vo-Ag. Teachers, Experiment Stations, and progressive farmers everywhere depend on it.

You Take No Risk **Our Daring Guarantee**—We are so certain you'll get bigger yield and better quality with your **Sudbury Soil Test Kit**, we'll refund the full purchase price anytime within a year, if you don't.

SEND NO MONEY

Order today, C. O. D. only $29.95 plus postage. Or send check and we'll pay postage, saving you from $1.26 to $2.93 in postal charges.

FREE BOOK In addition to saving postal charges, we also include the valuable 64-page book, "Our Land and Its Care" FREE.

BETTER CROPS Guarantee

Order Right Away!

SUDBURY LABORATORY, Box 936, South Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care."

☐ Send C.O.D. only $29.95 plus postage.

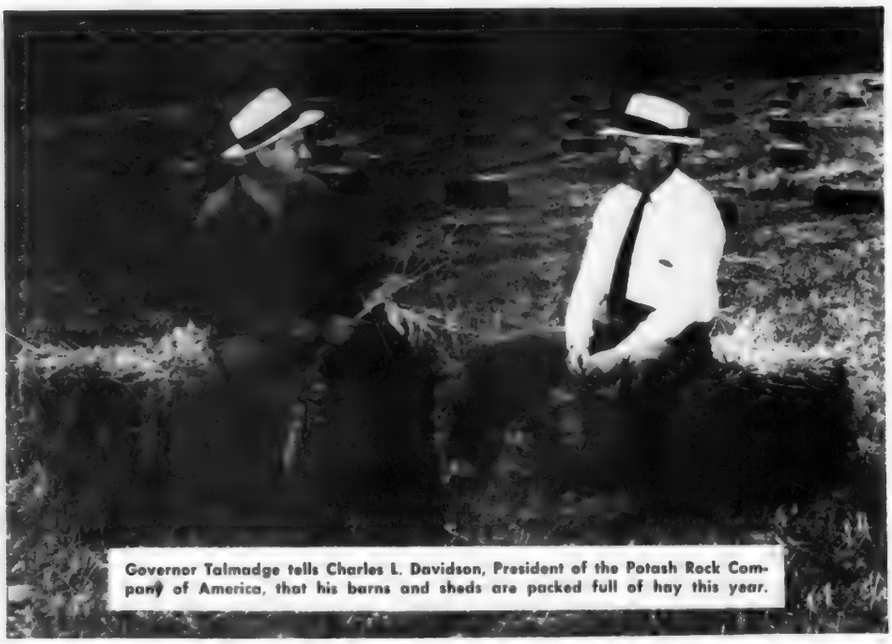
Name .....

R.D. or St. .....

P.O. ..... *Zone* ..... *State* .....

— Send on Easy-Payment Plan—I'll pay mailman $4.95 — plus postage, then 4 monthly payments of $6.75 each.

"Thanks to HYBRO-TITE* our pastures are the finest I have seen anywhere"



Governor Talmadge tells Charles L. Davidson, President of the Potash Rock Company of America, that his barns and sheds are packed full of hay this year.

—says GEORGIA'S GOVERNOR TALMADGE

That's a wonderful tribute to Hybro-Tite, nature's own 20-mineral** soil conditioner... especially when you consider Governor Herman Talmadge has for years selected the finest seeds and fertilized his pastures heavily for better grazing and bumper yields of hay.

As the Governor drove over his 2500-acre farm, near Atlanta, he remarked, "Here are fields on which we used Hybro-Tite... we grazed 140 head of cattle all last winter and spring, and cut 1½ tons of hay per acre in May.

"Here is a field the cows avoided, which had no Hybro-Tite. They knew where the grass tasted better!

"Next year we want to use several carloads of Hybro-Tite... the Hybro-Tite applied last fall and winter on grassland will probably 'hold' for the next 5 to 6 years."

Try this NATURAL SOIL CONDITIONER—this fall!

Governor Talmadge's experience with Hybro-Tite soil conditioner may also be your experience, if an analysis of your soil indicates the need for additional potash and the 19 trace minerals which Hybro-Tite contains.

So, whether you are interested in pastures, orchards, citrus crops or truck gardening, why not try Hybro-Tite on your farm? Fall is the perfect time to spread Hybro-Tite for greater yields next spring and summer.

Write for Details TODAY! Learn more about this low-cost natural rock soil conditioner. You owe it to yourself to get the full facts about Hybro-Tite now. Send for FREE BOOKLET, details of our test offer, and reports of success from many other users of Hybro-Tite. Write card or letter to Charles L. Davidson today.

POTASH ROCK COMPANY OF AMERICA
INCORPORATED
Lithonia, Georgia

*Trademark of Potash Rock Company of America, Inc.

**Potash—plus aluminum, silicon, sodium, titanium, calcium, phosphorus, magnesium, iron, manganese, strontium, yttrium, silver, zinc, zirconium, lead, chromium, nickel, vanadium, copper.

FARM BOOKS

Range Management, by A. W. Sampson. John Wiley and Sons, New York, $7.50.

In the days when the range was unfenced and a rancher felt that he lacked elbow room if a neighbor moved within 50 miles of him, range management consisted of branding strays and shooting rustlers and horse thieves. As the limitless open range disappeared and ranchers had to make the most of the grazing lands within the boundries of their fence lines, agricultural scientists turned to the age old problem of making two blades of grass grow where only one had grown.

Dr. Sampson was one of the first of these scientists to begin studying the problems of the arid grazing lands. He was responsible for some of the earliest experiments in deferred rotational grazing, range reseeding, natural plant succession in relation to grazing, and the identification and eradication of poisonous plants.

In this well illustrated, 570 page book, Dr. Sampson describes the grasses, brush, trees, and other plants, with special emphasis on their root systems and seed production which make it possible for them to survive and reproduce in the arid sections which we call range. He also takes up the problems of reseeding, water conservation, sanitation, supplemental feeding, and other general practices which are common to all classes of livestock and then considers the special management practices which should be followed with cattle, sheep, and goats. In a final section, he writes of some of the economic aspects of ranching such as buying vs. leasing of ranches, the distribution of the capital investment, selection and marketing of stock. Also in this section

(*Continued on page* 92)

THE FARM'S PICTURES

Cover by Fred Knoop

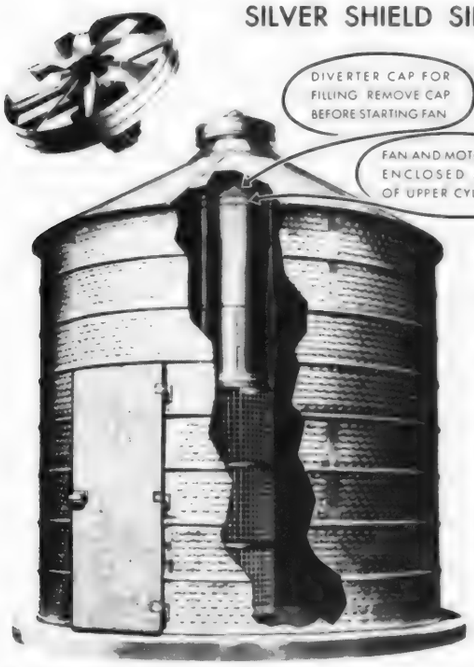
5—Fred Knoop. 17—Howard Clapper. 32 through 34—Fred Knoop. 35—Standard Oil Co. (N. J.). 36 through 41—Fred Knoop. 42 and 43—J. C. Allen & Son. 44 and 45—Cy LaTour. 46—Homelite Corp.; Gravely Tractors, Inc.; Strunk Equipment Co., Mall Tool Company; Homelite Corp.; Titan Chain Saws, Inc.; Henry Disston & Sons, Inc. 47—McCulloch Motors Corp.; Hoffco, Inc.; Lombard Governor Corp.; Dudgeon, Taylor & Bruske, Inc.; Reed Prentice Corp.; Hydra-Flex, Inc. 48 through 51—Kazik Pazovski. 52 through 55—Fred Knoop. 56—USDA; Joann Bell Pierce. 57—Fred Knoop. 58—Joe Munroe. 59—Drawing, Robert C. Smith. 60—Allis-Chalmers Mfg. Co.; Drawing, Robert C. Smith. 61—Robert Holland from Shostal. 62—Cy LaTour; J. Walter Thompson Company. 63—J. Walter Thompson Company. 64 through 67—Kazik Pazovski. 68—University of Missouri. 69—Strohmeyer & Carpenter. 71—Strohmeyer & Carpenter. 72—Kazik Pazovski. 73—Kazik Pazovski; Fred Knoop. 74 and 75—I. I. Case Company; Kazik Pazovski. 76—Dick Logan. 77—Drawing, Robert C. Smith. 78—Agnes Pendergast Kane.

meet winter PREPARED- store your crops in STEEL

SILVER SHIELD SILOS KEEP SILAGE IN TOP CONDITION

MOISTURE PROOF—rich silage juices can't leak away. AIRTIGHT—no side-wall spoilage losses. FIREPROOF, WINDPROOF, ROT PROOF, RUST RESISTANT, EASILY ERECTED, SMOOTH INSIDE SURFACE permits settling and packing. LOCATION—close to barn and feeding troughs. Silver Shield Steel Silos can be taken down, moved and erected at another place. ALL SILOS ZINC-GRIP, GALVANIZED STEEL. GOOD SILAGE FROM SILVER SHIELD STEEL SILOS OFFERS THESE GREAT BENEFITS: Increased nutritional values through complete fermentation. Longer storage in excellent condition to provide year-'round pasture. More succulent. No spoilage around edges. Quick thawing in freezing weather. Less labor in feeding to animals. Takes smaller quantities to provide the same nutrition.

SILVER SHIELD SILOS—FOR GRASS AND CORN SILAGE



BUCKEYE CORN CRIBS

STORE CORN SAFELY, RAIN OR SHINE

The new Buckeye Corn Crib is made of heavy, 22-gauge, galvanized steel—with unusual perforations which let air in but DO NOT allow rain or rats to enter. A center ventilating shaft contains the heart of the new Forced-Air System—the motor and fan which pull air through the crib, bringing corn to the safe storing moisture level no matter what the weather. After the right moisture content is reached, the fan is turned off. BUCKEYE STEEL CORN CRIBS ARE RAT PROOF, WEATHERPROOF, RUST RESISTANT, LIGHTNING PROOF, FIREPROOF, EASILY ERECTED, LONG-LASTING, and REQUIRE LITTLE MAINTENANCE.

*BUCKEYE CORN CRIBS are also available without fan & motor.

CLAYTON & LAMBERT MFG. CO.
1704 DIXIE HIGHWAY • LOUISVILLE, KY.
MANUFACTURERS OF SILVER SHIELD SILOS, BUCKEYE CORN CRIBS AND GRAIN BINS

CLAYTON & LAMBERT MFG. CO.
1704 DIXIE HIGHWAY
LOUISVILLE, KY.

Please send me the name of your nearest dealer, and complete details on ☐ Silver Shield Silos ☐ Buckeye Corn Cribs ☐ Buckeye Grain Bins.

NAME_____

ADDRESS_____

"...that's MY hybrid"

No wonder that thousands of farmers say, "That's my hybrid," when the name PIONEER is mentioned. These farmers know of the very outstanding record PIONEER has made in official state yield tests clear across the corn belt . . . year after year. These farmers know, from their own pleasant experience, that PIONEER germinates strongly—grows rapidly—stands erect—matures properly—and picks efficiently. But, more important, they know that PIONEER produces LARGER and MORE PROFITABLE YIELDS of sound quality corn. Once you have grown PIONEER on your farm—you'll say, "That's my hybrid."

SEE YOUR LOCAL PIONEER SALESMAN TODAY

Let him help you select the PIONEER Varieties best adapted to YOUR farm

PIONEER Hybrid Seed Corn is produced by the following companies:

Gerst & Thomas Hybrid Corn Co.	Pioneer Hi-Bred Corn Co.	Pioneer Hi-Bred Corn Co.	Pioneer Corn Co., Inc.
Coon Rapids, Iowa	Des Moines, Iowa	of Illinois; Princeton, Ill.	Tipton, Indiana

More ears, fewer husks, faster picking

Get what you grow! Go into your corn with a NEW IDEA Picker and pick it clean. Fill your wagon box in a hurry with full-grained ears.

Watch those floating points and low-reaching gathering chains skim along the ground — lifting and funneling down corn or tangled and bent stalks into the snapping rolls.

Is your corn damp? Dry? Brittle? Tough? Set your snapping rolls accordingly. There's a wide range of adjustments available for any crop or field condition. With a NEW IDEA you're set to get the most ears snapped and delivered to the husking rolls. Six floating presser wheels and adjustable rolls work together to give you the cleanest husking you've ever seen. Shelling is kept to a minimum. What little shelled corn there is gets caught by the shelled corn saver. It is separated from the husks and put into the wagon box.

You get this sort of performance at the rate of 8 to 12 acres a day — day after day, year after year, with a NEW IDEA One-row Picker. Or increase your daily picking up to as much as 18 acres with a NEW IDEA Two-row Picker.

Your NEW IDEA dealer can point out to you exactly why you get this sort of steady, efficient service with these rugged pickers. See and compare . . . and you'll know why it's such a *good idea to own a* NEW IDEA.

Two-row New Idea Picker — 1952 Indiana State Champion. Plenty of capacity for the big jobs.

Send in coupon for detailed information.

NEW IDEA FARM EQUIPMENT COMPANY
Division AVCO Distributing Corporation

Dept. 859, Coldwater, Ohio

Send free folders as checked.

- ☐ Corn Pickers & Snappers
- ☐ All-Purpose Elevators
- ☐ All-Steel Wagons
- ☐ Steel Wagon Boxes
- ☐ Stalk Shredders
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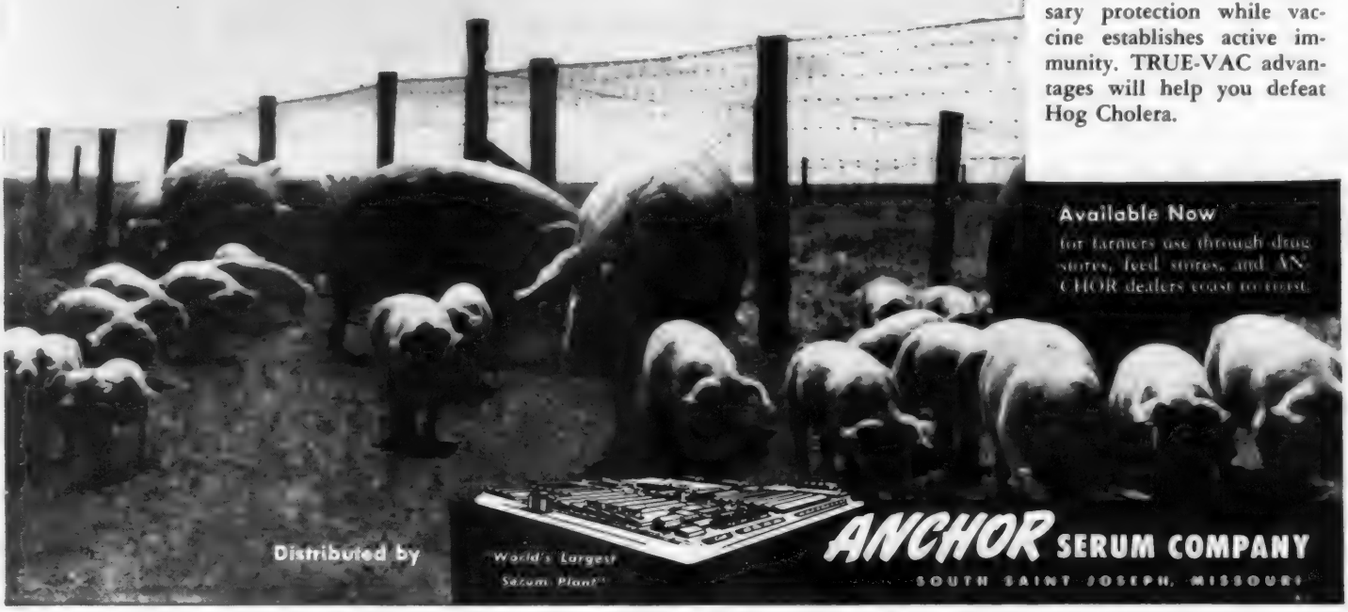

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Quonset owner leads the way to greater grain profits

W. R. Mitchell, tenant farmer, of Grundy Center, Iowa, views with pride his 1952 corn crop—the first corn picked in Grundy County last year.

Because Mr. Mitchell used a Quonset combination ear corn drying unit and granary, he was able to begin picking his corn on September 27—at 30% moisture content—up to 30 days before his neighbors. Mr. Mitchell reports his picker left less corn in the field, his corn borer loss was minimized and he no longer worries about a wet fall when the corn is slow to field-dry.

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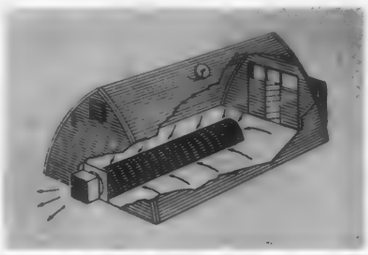

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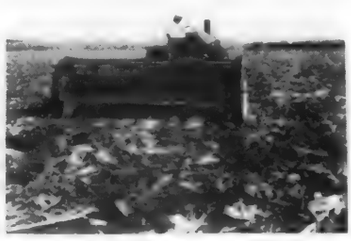

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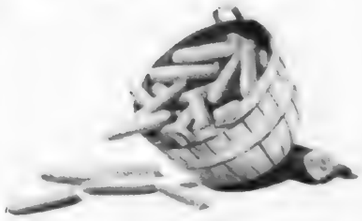

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A field you estimate at 75 bu. per acre could yield over 80. The difference is in the extra ears — gathered by the low-sloping Corn Harvester from leaning stalks and difficult positions.

Rubber-grip rolls leave kernels *on the ear* . . . instead of on the ground! There's less shelled corn in the load, too, and that means better air circulation in your crib . . . fewer mold pockets.

Corn should be picked *immediately* when it has a just-right feel. (Kernels dented, cob tough.) Picked at the right time with your home-owned Corn Harvester, it will husk better and shell less.

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TWO-ROW AND ONE-ROW
CORN HARVESTERS

By Grant Cannon

TEXAS It's Wonderful

The warm wind that flows over Texas from the southeast is heavy with moisture from the Gulf as it crosses the Sabine River and the coastal plains, crosses the bayous and the tall pine forests. As this humid air is chilled, it drops its rain on the forests and on the rich blacklands where a man and his family are kept humping to farm 15 or 20 acres of cotton. Further to the west and north, more rain falls on land which is less intensely cultivated, where quarter section and half section farms rotate meadow and corn and wheat, and where cattle can be pastured one to the acre.

By the time the wind has crossed the Balcones escarpment, the geological fault that divides Texas like a belt from north to south, it has lost most of its moisture; it blows across parched land, stirring the feathery leaves of the mesquite, scouring the earth between the tufts of buffalo grass, tossing up a spray of red dust as it crosses the bleak ranch roads. Even from the realm of the wind, the ranches here seem vast and unfenced—here they trade space for moisture, here it takes 20, 30, and even 60 acres to feed a mother cow and her calf.

The headquarters buildings on one of these West Texas ranches—The Pitchfork spread—are almost lost in the vastness of 165,000 acres. They stand out because of the Chinese elms and the willows on the bank of the dry bed of the Wichita River. The light haze of blowing dust powders the leaves of the trees and sifts against the windows of the ranch house, the office, the commissary, the chuck house, and the out-buildings.

FOURTEEN SELF-PROPELLED COMBINES carve into a 15,000 acre field of ripe wheat at the Waggoner Ranch. Cattle range over most of the half million acres of this ranch, but 26,000 acres are used for crops.

Out on the range the ranch manager, D. Burns, sat in his car near a group of holding pens and corrals watching a round-up. He stayed in his car because neither car nor horse will frighten the cattle, but they will turn from a man on foot. The men, horses, and cattle could not be seen, but a cloud of dust rising over the mesquite showed where they were. These mesquite, the bane of the cattle country because they use moisture and rip the hide of men, horses, and cattle, have been sprayed with 2-4-5-T and stand as bare skeletons with

COWBOYS, HORSES, CATTLE AND RANGE make a ranch. In a dusty holding pen, the Pitchfork cowboys cut out the yearlings for shipment to Wyoming so that the dry Texas range will have fewer mouths to feed.

only a few of them showing a fern-like regrowth around the base.

As the cattle came nearer, Burns could hear the bawling of the cows and the almost sheep-like blat of the calves and then the men's voices, "Haw, there, haw!" "Hi ya ya ya!" and the pop of the reins as they were whipped against chaps. Two horsemen came over the top of the hill and rode down through the trees, followed by the red and white mass of cattle. At a distance the flow of cattle seemed to eddy and ripple as individuals stopped to graze and others pushed around them. Outriders held the bunch together, swinging the loops of their ropes like whips when one tried to stray; three men and a boy brought up the rear—one with a yellow neckerchief pulled up over his nose—weaving back and forth, keeping the cattle moving.

The smell of dust filled the air as the herd of six or seven

ONE OF THE WORLD'S MOST VALUABLE ANIMALS, Larry Domino 107, poses calmly with Joe Bridwell (right) and Bud Thurber, the ranch manager. Bridwell paid $80,000 for a half-interest in Larry; he is making his investment pay by using artificial insemination on the purebred cow herd.

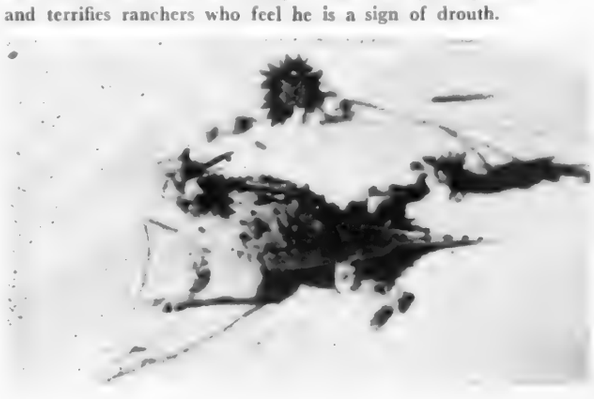
hundred cattle came nearer. Coy Drennan, the wagon boss in charge of cowboys, brought up the rear. His sunburned, dust-powdered face looked dark as an Indian's between his light straw hat and his yellow canvas brush jacket. Some cowboys were wearing blue denim jackets; others wore long-sleeved shirts—red and white candy striped, green and white striped, and sun-tans; one had a Second Armored Division patch on the shoulder. All of them wore Levis beneath their dark leather, mesquite-clawed chaps.

The two lead riders reined up beside the gate leading into the holding corral to keep the cattle from spreading while the outriders and the men with Coy Drennan pushed the herd on through. Neither Drennan nor Burns gave an order: the cowboys knew the job and worked as a team as they did it. Inside the corral the cattle ringed the steel tank beside the windmill and drank the alkaline "gyp" water. All of the windmill-pumped water on the Pitchfork ranch is more or less alkaline, or gypy, from the gypsum in the earth, but here it is particularly strong. This is Croton Brakes, so called because a glass of the water will have about the same effect on a man as a dose of Croton oil.

As the cattle were run through a cutting chute where the yearlings were separated from the cows and calves, two large trailer trucks ar-

THE WAGGONER HELICOPTER rounds up strays from the mesquite brush (right) and worries them back to the herd. From his plexiglass bubble, the pilot can spot cattle which a man on the ground would miss.

THE HARMLESS HORNED TOAD frightens children, who believe the blood he can squirt from his eyes is poison, and terrifies ranchers who feel he is a sign of drouth.



rived to haul the yearlings off to the railroad to be shipped to the Pitchfork's 32,000-acre Wyoming ranch. This would take some of the burden off the dry Texas range.

When the last of the yearlings were in trucks, D. Burns finished his tallying on a gate slat and wrote the results in a notebook. "I don't remember ever seeing it blow so long from the south-east without rain," he said, wiping dust from his forehead. "It hasn't been this bad since 1934."

"I seen a tarantula this morning, Dee," one of the cowboys said, "and Bill, over there, claims he seen a scorpion yesterday. Those are supposed to be good rain signs, they say."

"Yeah, and I saw a terrapin crossing the road this morning. But they also say that rain signs don't work during a drouth," Burns answered.

Burns and the assistant manager, Jim Humphreys, drove bumpily across the range, passing the cows and calves, Burns said, "Those cows sure look a lot better than the range—better looking than we have any right to expect."

Burns drove some 20 miles to get back to his office. At headquarters, he drove into the yard around which the ranch buildings are grouped. The commissary and chuck house, with its walk-in refrigerator and restaurant-sized range, are on the south side of the yard on the banks of the often dry Wichita River near the site of the original headquarters buildings, which were dug-outs in the bank of the stream. A dairy barn and horse corral form the west side of the rectangle; grain storage buildings, machine shop and windmill repair shop with their forges and power machinery and machinery housing space form the long north side. On the east side is a building which Burns calls "The Monstrosity," a bunk house which looks like an old Bachelor Officer's Quarters. Two pleasant homes for the assistant manager and the machine boss flank the bunk house, and the narrow two-room office, with an old locomotive bell from the Fort Worth and Denver railroad in front, fill in the east side of the ranch yard.

The big ranch home stands back in a clump of Chinese elms near the chuck house. Its screened-in portico has sides made like a very tall fence with screen instead of woven wire fencing attached—this was the best way Burns could describe the structure to the cowboy-carpenter who made it.

Standing in the high-ceilinged living room with its Catlin prints, sage green chairs and sofas, and cool grey rug, D. Burns looked around at the colonial secretary, the highboy and great fireplace, chuckled and said, "You know, I've ranched in houses where you could see the ground through the floor and the sky through the roof, and I know that all of this isn't *absolutely* necessary to produce beef, but I can't deny that it's pleasant for me and Mrs. Burns." And Burns should know what it takes to grow beef. He has reached that satisfying period in his fifties when a man has the experience of a lifetime to back him up, but is not yet old. Most of Burns' experience has been with cattle; he was raised on a ranch—his father sighted the North star many a time as he rode herd to Abilene and once was on the trail for eight months; his grandfather was one of the cattlemen who sent Jesse Chisholm north with cattle—and he has owned and operated ranches most of his life.

Back in his office, Burns got onto the telephone to make sure that the railroad would have 13 cattle cars spotted on the siding at Narcisco when the yearlings arrived. On the ranch phone—like many of the big ranches, Pitchfork has its own telephone system—he dispatched two men in a pick-up to Pueblo, Colorado, to meet the cattle train and see to it that the animals were rested and fed. Then he put in a call to Wyoming to start Don Webber, his man there, looking for pasture which might be leased for more such shipments.

While Burns was waiting for his call to go through, Tom Thornton, a cowboy in his sixties—Pitchfork has four men over 60 years old who are in the saddle all day—rode up to report a windmill near the Keller-Field camp out of order. Burns promised to have the windmill crew stop by in the afternoon. When Thornton had gone, Burns said, "There's a great cowboy—one of the best. He's been on every big spread in this country—used to be range boss for the Matador's Canadian ranch. When he was young he was as wild as a smokehouse rat, and it takes a pretty good man to keep up with him today."

There were four desks in Burns's office, one of which was loaded down with papers. *The Lubbock Morning Avalanche, The Kansas City Daily Drover's Journal, The Wall Street Journal,* all piled there waiting for a spare moment when he could get at them. His own and Humphreys' desks were covered with ranch papers, invoices, ledger sheets, estimates, registration papers for the purebred herd. The typewriters and adding machine looked strangely out of place with the cow-hide covered chairs and yellow wooden walls covered with an assortment of leather lariats, rifles, Western calendars, aerial pictures of the ranch, and a pair of well-worn chaps. But they are all tools of the practical management that Burns gives this hard-working cattle outfit.

THE WAGGONER RANCH COWBOYS. (Top) G. L. Procter, the wagon boss, shows a pale, protected forehead when he tilts his hat—his lips are coffee-washed of dust. (Second) Frank Hanley and Robert Mackelroy, two top hands, model shotgun and bat-wing chaps. (Third) the oldest employee on the ranch, Zack Reed, drives the hoodlum wagon. (Bottom) Ross Malone, the ranch game warden, keeps in touch with the ranch office by radio telephone.

When he had finished his call to Wyoming, D. Burns phoned the Croton camp on the ranch phone. "John, I was over your way this morning. Sorry I missed you; I said, Sorry I missed you," he shouted into the old-fashioned crank phone. "Wish you'd taste of that water in the holding pen tank. I think it may be going a little salt. . . . Hell, you don't have to drink *that* much of it, man, just a little taste. If it's salt, we'll have to run a pipe from the windmill near camp. And the next time the tank is empty, I think we ought to paint it—it's scaley. I'll send over some paint with your supplies. And John, you might pull that water gap out of the upper fence and let the cattle get back on the hill: that lower pasture looks mighty poor; better not over-graze it."

After he had put in another call to Wyoming about a shipping permit and phoned the veterinarian about a health certificate, Burns left his office and got into his car for a drive to the other end of the ranch to check on some plowing and look in on the purebred camp. He had been up since four-thirty, had worked in the office, and was out on the range by seven. He would drive a couple of hundred miles over rough roads during the day checking the range and the cattle, arranging for land preparation to be ready to plant sorghum in case of rain, talking with his men on work to be done and the progress of the job at hand. He would end the day with another session in the office checking the books, writing letters, keeping up the flow of supplies to the ranch, and arranging cattle sales.

"We put in fairly long hours, all right," Burns said with a grin. "A visitor here at the ranch once told me, 'You can stay all night here quicker than anywhere in the country.' Like any big business, you've got to keep pulling the loose ends together to make it mesh. I tell you, a day in the life of a ranch manager is a nightmare."

The Pitchfork Ranch is one of the oldest in this part of Texas. "We wore out one fifty-year charter here and we're giving our second a good working over," an old timer on the ranch said. The ranch was put together and the brand established by Powers and Savage about 10 years after the Civil War and was taken over by D. B. Gardner and Eugene F. Williams of St. Louis in 1882.

Pitchfork spraddles over two counties, King and Dickens, at the base of the Panhandle. Its nearest neighbors are other giant ranches. They must be big in this country where in good years one cow must have 20 acres of range. Fifteen miles east is the red stone, castle-like headquarters of the giant 6666. Concerning the name of this spread, Burns said, "There is a legend that Burk Burnett won the ranch at poker with four sixes — I don't know whether there's any truth to the story, but I will say that he was quite capable of it." To the north is Swenson's Tongue River Ranch. And in the rough country, to the west and north of The Pitchfork, is the Scotch-owned

THE KING RANCH. Headquarters buildings of the King ranch cluster around a Spanish style mansion, family home of the owners of the ranch. King ranch workers live in pleasant, ranch-style houses in four villages, each of which has its own large lawn and flower garden.

Ψ **THE PITCHFORK MEN.** Paper work starts at five a. m. for D. Burns, above, the ranch manager; later he will drive over the range checking work in progress. (Right) Chalmer Reid, the cook, says: "Some men don't care for sourdough biscuits, but they are just plain damn fools, so forget them." Sourdough is bread sponge made from flour, sugar, salt, potato water, and wild yeast. To the soft sponge, more of the same ingredients are added when biscuits are to be made. When they are put into the Dutch oven, some dough is held back for starter for the next batch. Good cooks protect the sourdough at all costs: some have been known to take their keg to bed with them during bitterly cold weather. (Below) In the shade of the chuck wagon during the noon *siesta*, one cowboy hones his knife on the worn chaps of a friend. The younger boy is the son of the wagon boss.

Matador Ranch, once second in size only to the million acre King Ranch. The Matador is now being broken up and sold—Pitchfork recently acquired some 43,000 acres of rough land from this source.

From the beginning, water was the live-or-die element of the ranch. Like most of the ranches in this part of the country, they depended on wells. Today, Pitchfork has over 100 windmill-pumped wells which are drilled to a depth of from 75 to 500 feet. Further east, the ranchers depend more heavily on catching surface water in earthern tanks — huge farm ponds built along any water course by pushing up a horseshoe-shaped dam to form the three sides of the pond.

Like most of the big ranches, Pitchfork operates with a series of camps spotted strategically over the spread. Each camp has a pleasant, modern ranch home where the camp operator and his family live comfortably. The camps are located so that one man can cover a part of the ranch, riding his section of the 300 miles of fences with a pocketful of staples and a hammer, checking the windmills and watering tanks to see that the water is flowing, and chopping holes in the ice in winter, herding the sorry looking dogies back to the mother cows to get them adopted, occasionally roping a calf to doctor it for screw worms.

Whatever one man can do, the camp operators do themselves; when they need help they call on Burns and he sends out the windmill crew; or the machinist, or, if it is cattle that must be worked, the chuck wagon and cowboys. When new fence is to be built, he sends out a band of Navaho Indians, who arrive like gypsies to make their camp and build the straightest, strongest fence in Texas.

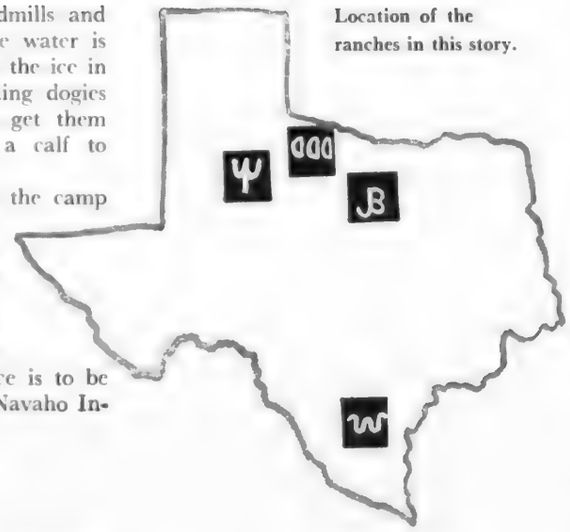
Working the cattle is an all year job, except, perhaps during the hottest part of the summer when they try to let them rest. In the spring, Chalmer Reid, the lanky, placid cook, drives his chuck wagon with its 'possum belly underneath loaded with rattling pans and supplies out across the ranch for the round-up, followed by his helper, Slug Mayo, the hoodlum. He drives the hoodlum wagon filled with bed rolls and the branding irons. The hoodlum collects firewood for the cook and for the branding fires, helps Reid spread a big canvas fly over the chuck wagon and starts heating branding irons ready for the first "Hot Iron!"

As the smell of burning hair and hide drift back to the chuck wagon, the cook gets out his precious keg of bubbling sourdough and a sack of flour, begins heating a dutch oven, and curses loud and long at the dust which sifts under the lid of a pan of pork and beans. "I aim to feed them a sort of balanced ration," Reid said, "sourdough, beef, beans, fruit and coffee. A man gets all the iron and yeast he can use out of sourdough bread."

For weeks the cowboys comb the pastures rounding up the calves. When they are roped and thrown they brand them, dehorn and castrate the bull calves, innoculate them with a combination shot for blackleg and malignant edema, and slice off the tip of their left ear to show that the other jobs have been done. The ends of the bulls bags are kept in one pile and the ear tips in another; at the end of the day they subtract the bag ends from the ear tips and get their tally of heifers and steers. Later in the year, they go over the pastures again to catch long-eared calves that have been missed.

A soon as the round-up is over, the yearlings are cut out of the herd and shipped to Wyoming to fatten on grass. Around the first week in April, the Hereford bulls are put in with the commercial cows. The heifers are held back until they are 18 months old to give them a chance to get better growth. In the fall, the calves are weaned—cut out from the cow herd and trucked to winter wheat pastures—and the cow herd is culled. During the whole year the cattle are moved from pasture to pasture as one piece after another is played out and needs a rest.

In the winter, the bulls and purebred cows, the weaned calves, replacement



Location of the ranches in this story.

"GIT ALONG LITTLE DOGIE, git back to your mammy; there's black buzzards circling and the pasture is dry;
"Your gant ribs are showing, your ears are bare leather; git back to your mother or you're bound to die."

heifers, and cows with unweaned calves are fed pelleted cottonseed cake and sorghum fodder, the rest of the herd roughs it through on range and winter wheat pasture.

Some of the camps on the ranch specialize in a particular branch of work. Veto Austin and his boy run the purebred herd out on the north side of the ranch where hackberry trees compete with the mesquite. Here, the ranch raises all of its replacement bulls and occasionally has a few good bulls for sale. On the rolling terraced lands near the center of the ranch, Bill Myres, with 4 to 10 men to help him, cultivates the 4,000 acres of cropland and keeps some 25 or 30 brood sows. "No mistake about it," Myres said, "the farmland, like everything else around here, is run for the cattle. We plant oats and hegari and pick them up with a binder for hay for winter feed. And we rotate these crops with wheat. In the fall and spring the wheat fields are pastured up to around March 25 and then we take them off and make a cash crop of wheat. But if its a poor feed year, like this last one, the cattle will feed right on through and eat every blade of wheat that grows." The pigs are traded to the packing plant for bacon, ham and pork for the commissary.

Bill Myres' duties do not include seeding the range. The only effort that is made to grow more little bluestem, wild rye, gramma, or, most important of all, mesquite grass, is to rotate the herds so that each pasture gets a rest and a chance to make recovery growth. "What we *try* for," Burns said ruefully, looking at the dry range, "is to have a reserve of grass.

(*Continued on page* 115)

KICKING UP A STORM OF DUST frightens the yearlings up the ramp onto the waiting trucks. There is plenty of dust in Texas this year; areas where they normally get 16 to 18 inches of rain have parched a half year with less than five inches.

The Dependable Hybrids

By Fred Knoop

HYBRID SEED and high-speed farm machinery have changed the old saying "knee high by the 4th of July" to "laid by". This is Lyndon Gray's corn in Southern Ohio on the 5th.

THE MISSOURI FARMER has no corner on the "show me" attitude when he buys his seed corn. Encouraged by hybrid seed growers and extension men, Midwest farmers have tried out hundreds of varieties over the past three decades to see what hybrid would do best for them under their soil, climate and rainfall conditions.

Today the farmer demands these qualities in the seed he plants: 1) High yield: 2) Freedom from root and stock lodging: 3) Disease and insect resistance: 4) Proper maturity for his length of season: 5) High shelling percentage of kernels to cob: 6) Vigorous germination, of 90 per cent or better (most seed will do 95 per cent or more); 7) Corn that picks well with mechanical pickers; 8) Corn that can make the most of our new corn raising techniques (in a good growing year, an 18,000-plant population per acre and heavy fertilization should have a potential of over 150 bushels per acre). These are qualities that seed breeders have aimed for, and got, in some of the remarkable new hybrids.

There have been fads in corn just as extreme as in hogs or barns, but these fads have not resulted in the best corn or the highest yields. It wasn't too long ago that the corn plant that didn't get as high as an elephant's eye was a black mark against its planter. Even today in some parts of the country corn is sold on "sex appeal." If a man can select ten ears from his fields, borrow a couple more from a good neighbor, put them on display at the county fair, and win the "best dozen ears of corn" prize, the salesman who sold him the seed can book orders from farmers for miles around. But unfortunately, corn glamour does not guarantee high yield, disease resistance, or other qualities.

What Hybrids Have Done

The aim of the men who breed corn is to develop plants that will produce more food with less effort. How well the hybrids have succeeded can be judged by the revolution that has taken place in the last 35 years. There were plenty of objections to hybrids at first: "This new-fangled corn doesn't *look* as good as the corn I'm growing:" "The seed costs more:" "You can't save the seed from your best field—you have to buy *new* seed every year." These were some of the complaints. But the yields of the new corn were sensational, 10 to 25 bushels more to the acre.

This year our corn production, on slightly over 80 million acres, is expected to yield our second largest crop—three and a third billion bushels. And this crop is being harvested from slightly over 80 million acres in place of the 100 million acres that formerly were in corn. Nearly 20 million acres have been released for pasture, legumes, and other soil building purposes. Better seed and better growing practices are helping us feed our growing population, on less corn land.

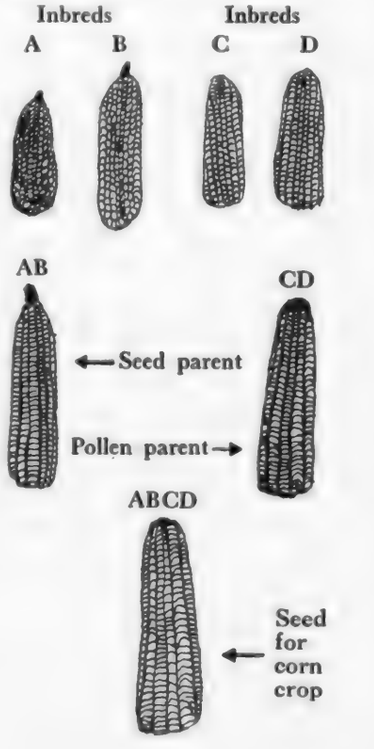
Gus Tebbe, of Tipton County, Indiana, is a farmer who bought his farm just about the time hybrids were becoming generally used. He is quick to say that big corn yields have made him one of the most prosperous farmers in the county. Of the 1700 acres he farms, about 550 go into corn each year. As you drive into the grove of century-old oak trees that shade his house, the neat line of cars make you think it must be threshing day. "Nope, nothing special today," answers Gus to your question of what is going on. "We're running two combines and baling some clover. These cars belong to the 13 boys who work for me the year 'round.

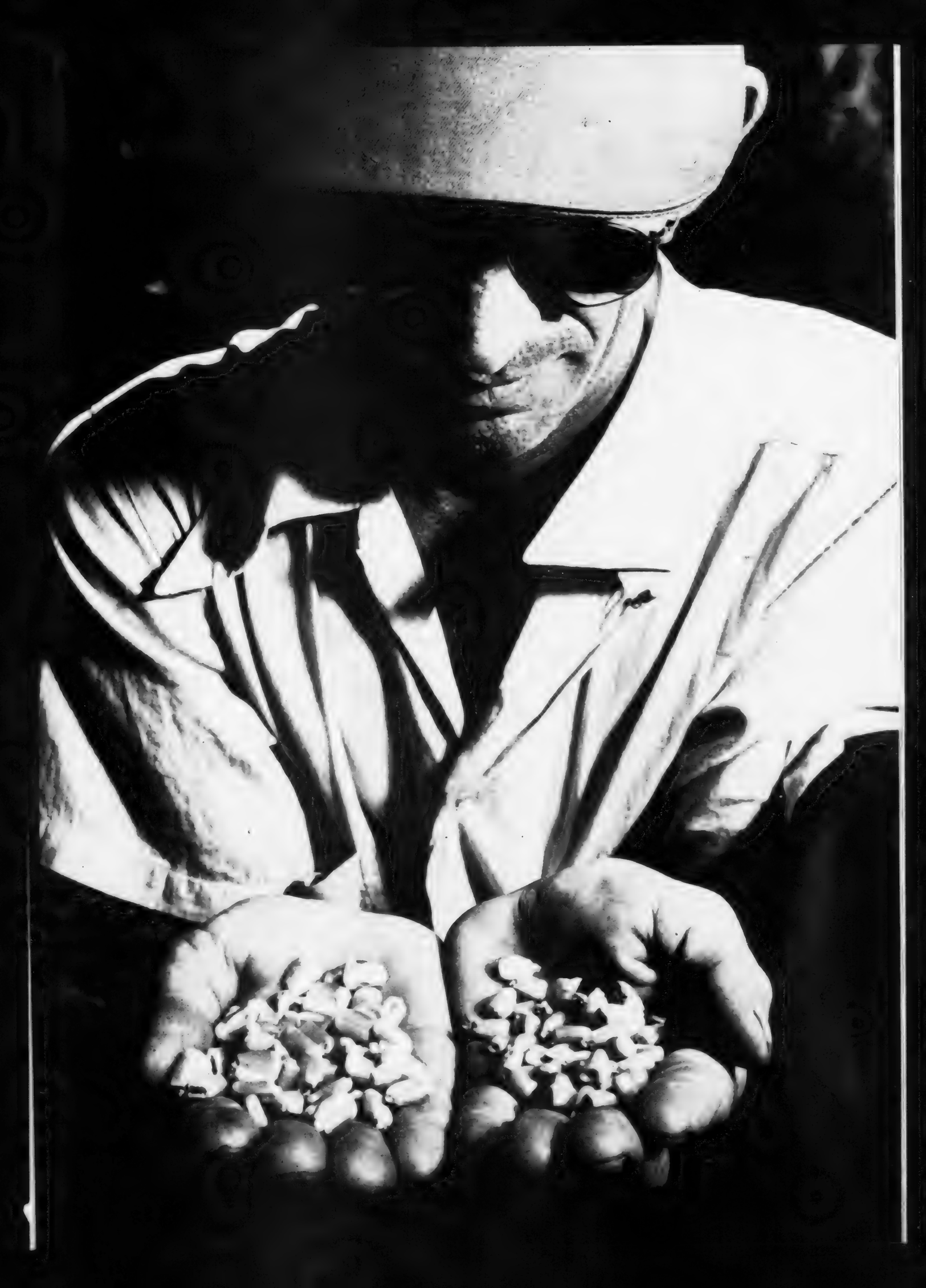
"We can't buy any more land, so we are making the best we can with what we've got. This was 60-bushel corn land for years but with what we know about seed and corn-raising now, we were able to haul in 105 to 110 bushels to the acre last year—and it was pretty dry.

"My Dad used to say, 'Get your corn knee-high by the 4th of July,' but today we can get it laid by for the 4th of July. This year rain bogged us down in early May. It was after the 22nd when we got the corn planters going. With our nine big International tractors and men who were willing to keep them running, we put in 550 acres in 8 days. We went through the corn with a rotary hoe in the

(*Continued on page* 111)

WHICH GROWS the best corn, flats or rounds? Seed experts say there will be no difference in the plants, ears or yield of the seed being held on the opposite page. All the kernels are from the same hybrid and carry superior germ plasm which will grow a big crop of corn.
BELOW, the family tree of hybrid seed corn. How well the seed scientists select the ancestors (top row) and combine them for the parents (second line) will determine the performance of the hybrid seed that is planted.





By R. J. McGinnis

CIDER

The virtues of apple juice, how it is made and preserved.

Just before the first frost, we picked the choice apples and stored them in barrels in the cellar; then we gathered the windfalls and loaded them into the box bed of our farm wagon for the annual trip to the cider mill. My brother and I needed no prodding on this job. The Winesaps, Pippins, Northern Spies, Jonathans, Russets and Rambos, and even the lowly Ben Davis, a good keeper but without sweetness, were thrown together into the wagon. Each added its delicate flavor to the blend. If an extra tang was wanted, a couple of bushels of crab apples were included. It was thought that late apples made the best cider; and they should be fully ripe, juicy and not "mealy". As we loaded the apples, we threw out the mushy ones.

Jolting along the dusty road in the warm autumn sun the smell of apples lifted around us. If your nose was sharp you could pick out the peculiar perfume-like odor of the Delicious and the musky tang of the Russet. The apple smell clung to our clothes and bodies.

At the cider mill the wagon pulled up at the end of the waiting line of loaded wagons, the horses stomping and switching flies. There, the smell of fresh apples was increased by the fermenting pomace heap behind the mill. We climbed down and joined the other small boys around the free barrel, which sat in the shade near the press. There was a tin cup there, but we shunned this, for we had brought along our own supply of rye straws. Inserted in the bung hole, a straw was our preferred method of bringing cider to lip. It came up in just the right volume so that each sip could be rolled around the tongue and the full flavor enjoyed. When our bellies got tight we had to stop, but cider tasted good even after you were full. Of course, we had what grandfather called the "backhouse two-step" that evening, but it was worth it.

It was a long wait through the summer until the fall apples ripened, and one year my brother and I jumped the gun. We had a tree of early Yellow Transparent and another of a variety of small red apple we called the Strawberry. We gathered up the windfalls under the two trees, quartered the apples, and ground them in the sausage grinder. After we had two or three tubs of pulp we pressed out the juice in the sausage press. The press lacked the necessary high pressure, and we sprung the handle, but working most of the afternoon we turned out five gallons of what we regarded as excellent juice. Grandpa smacked his lips over it too, but he took a dim view of the sprung handle and he showed us that we had squeezed only about half the juice out of the apples. "We'll get a regular cider press for you next year," he said.

FILLING a fifty-gallon barrel with a hand press was an all-day job. Grandma was there to see that the cider was properly strained and blended.

How to Keep Cider

The purpose of making cider in the old days was not primarily to supply a delightful beverage; cider was made then to supply the farm vinegar. Farmers have always found it difficult to keep sweet cider for any great length of time—it's just too darned good to drink. So those who wanted both vinegar and a drink made two barrels. The drinking cider was rolled into the cellar, a spigot hammered into one end, and a tincup was hung on a convenient nail. Then the family went on an apple juice spree.

The barrel reserved for vinegar was rolled to the sunny side of the kitchen and there it remained until nature had taken her course with it. Then it was spigotted, set up firmly on a platform, and referred to daily.

As soon as cider is in the barrel, a subtle change begins—it gradually loses its delicate flavor, some of the sugar changing to starch, and it starts to ferment or "work". By the next morning, in warm weather, there will be a thin layer of bubbles on the top—the bacteria have started to multiply and fermentation will progress rapidly. The head increases and the taste takes on a snap and zing which pleasantly tickles the tongue. After a week, the alcoholic content will go to 6 percent; sweetened apple cider will go to 11 percent alcohol.

Then one must take care, for this is "hard" cider. Small boys should be forbidden its comforts when it reaches the hard stage. Members of the temperance societies warn that here we have an alcoholic beverage.

As the alcoholic content reachs its maximum, another change sets in. The hard cider starts to sour, and it gets sourer and sourer. A stringy mass forms, composed of vinegar yeast, which is known as the "mother." Cider vinegar can be kept for a year or so if tightly stoppered; otherwise it loses its strength.

The King of Juices

Cider is a profitable by-product for the fruit grower, for it uses culls and windfalls, which, like the cow's hide to the meat packer, is often the margin of profit. The fruit juice vitamin fad boosted cider sales, for cider is the cheapest of all commercial juices, and stands up favorably with citrus, berry, and grape.

Cider is made today in much the same way as it has always been made—apples are reduced to a pulp and the juice squeezed out. In the old days farmers with small orchards had hand presses of their own, but the community mill got the bulk of the crop.

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CIDER MAKING was sometimes at one end of a production line for applebutter. The boiled-down cider gave applebutter a tang and helped preserve it.

Types, Uses and Maintenance of

THE business-like whine of one of the newer power tools—the chain saw—is being heard around the land. It will saw wood ten times faster than the old hand saw and do it easier. With a chain saw it's no job at all for a farmer to clear his woodlot, trim and prune his trees, supply his own fence posts, and saw his firewood. He'll need no extra help, and he won't break his back.

No one knows who first thought up the chain saw. There were a couple of patents in the mid-nineteenth century for "endless saws," but they never got beyond the blueprint stage; they did, however, establish several features in chain saw design which have carried over to the present—a three-eighth inch kerf, a guide plate, a saw chain with insert teeth which are integral with the individual links, and a method of riveting the links together.

From the Civil War period to 1905, at least 12 more U. S. patents were issued for chain saws of one type or another and there were several foreign patents as well. None was successfully manufactured, nor did the patents mention whether or not the saw was to be portable. None suggested a source of power. But in 1905 a patent was granted in England to a William Stanley for a chain saw that was clearly meant to be portable. The patent states, "It will be obvious that this form of saw may be advantageous to the surveyor or forester owing to the manner in which it may be folded and coiled for transportation." About the same time, other inventors were suggesting hand cranks as the source of power!

In 1908 Charles Wolf, a young mechanical and electrical engineer, noticed a crude log deck chain saw being used by the Potlatch Lumber Company in Idaho. He was so impressed by it that he designed an improved machine. In 1920, following years of intensive study of the chain saw, he put into production the world's first commercially successful portable chain saw in Portland, Oregon. This saw was powered by an electric motor, weighed between 70 and 90 pounds, and was operated from a generator station or a small portable generator.

If the logging industry had been ready to accept a chain saw then, many believe the Wolf saw would have served it very satisfactorily in the early twenties. Although it had its limitations, the essentials of a good woods saw were there. However, the loggers at this point saw only the shortcomings of the saw and declared that it "wasn't worth a plugged nickel." So Wolf was forced to turn to another industry, the construction trade, and create a new market for his saw. The saw was well-adapted to this field and was welcomed.

As soon as the success of the Wolf saw was seen, competitors flocked to the field. Competition began in Europe, then a few American firms began trying to get into the race, but without much success. In the late thirties the H. A. Stihl Company of Germany exported a 46-pound gasoline-engine driven chain saw which had originally been designed for the German army. The saw was powered by a good lightweight engine, which was probably the main reason it caught the eye of the logging industry. That same year the United States Forestry Service established the Equipment Development Laboratory in Portland, Oregon. Through the influence of the Stihl saw and the work of the Laboratory, interest in chain saws mounted among loggers. Saw and gasoline-engine manufacturers began to sit up and take notice. Though many of them began working on chain saws during this period, they had nothing ready for the market until just before World War II.

When war in Europe came, production of war materials and equipment in the U. S. was speeded up in anticipation of trouble. The logging business increased, but the labor supply decreased as the men went into service or left the woods for defense jobs. Soon the loggers began to call for chain saws to help replace the departing men. At the same time the

THE OPERATOR holds the saw in place—the engine does the work. Bumper should be placed firmly against the log before saw engages.

CHAIN SAWS

army wanted chain saws, too. So there were none left over for private civilian use.

In 1939 there was only one American manufacturer of chain saws for commercial use—the Reed-Prentice Corporation, which was producing the Wolf saw. At present there are over 13 companies in this country that manufacture portable chain saws for general use. Only within the past five years, since the end of the war, has the field become highly competitive.

Now that the use of this potent little power tool has spread from the lumbering and construction business to farm and home use, manufacturing emphasis has been placed on producing a compact, lightweight machine with the ruggedness needed for most cutting jobs. The results have been an amazing variety of saws. There are straight-bladed saws varying in lenght from 12 inches to 12 feet. There are bow saws designed to take pinching and binding out of cutting. There are one-man saws and two-man saws, and many one-man saws can be converted to a two-man tool by adding an extra handle. There are saws powered by gasoline, pneumatic, and hydraulic engines, and by electricity. There are even chain saws which may be attached to the garden tractor.

Some of the saws are powerful machines which are suited to felling the giant trees in the timber areas of the Northwest, handling heavy construction jobs, or doing other specialized work. The electrically driven chain saws, for instance, have become increasingly popular in the last two or three years. Their lighter weight per horsepower, convenience of use, and ease of maintenance make them ideal for use in the manufacturing, lumbering, and construction industries, and in other operations where they are within easy reach of electric power lines or a portable generator.

The pneumatic chain saw faces the same limitation as the electric saw in that it is not self-contained. It is dependent on an air compressor which, though it may be portable or truck-mounted, is still extra baggage when it comes to general use. These saws have had their greatest success at heavy duty timber-sawing for shipyards, on railroads and construction jobs. Many of them are used for safety in caissons, tunnels and mines where electric or gasoline engine driven units cannot be used because of the possibility of explosion. In underwater operations they are used effectively by divers.

The gasoline powered saw has one big point in its favor—it is the only self-contained unit and has greater mobility. It can, in fact, go anywhere the operator may want to take it. For this reason, manufacturers have concentrated on production of this type saw in lightweight, lower-horsepower models for use outside the industries.

How a Chain Saw Works

Let's take a look at this type of chain saw and see how it works. A typical gasoline-engine model saw for all-round use has a lightweight single-cylinder, two-cycle 3-5 hp. engine which develops tremendous power for its size. Lightness in the saw is coupled with strength by the use of magnesium and aluminum castings. Tough alloy steels are used in many parts as are airplane type die castings.

A gasoline-oil mixture acts both as a fuel and lubricant. A tug on the recoil starter knob, which has a cable permanently attached, starts the engine by spinning. The starter then automatically rewinds so that it is in place for later use. A clutch engages an endless chain, which has flat or curved teeth. There are depth gauges on the chain at intervals which govern the amount of bite, and raker teeth which sweep out the shavings.

While operating the saw, the left hand supports the machine by means of the front handle. A pistol-grip type handle is held in the right hand, and all controls are grouped so that they are easily operated with this hand. For example, to

THE AVERAGE FARMER finds maintenance relatively easy. Some prefer to dress the teeth themselves; others believe it a factory service.

start the chain. if the clutch is not automatic, the clutch may be engaged by squeezing the lower part of the rear handle and pushing the clutch safety lock upward with the thumb: relax your grip and the clutch slips into the engaged position. To stop it, disengage the clutch by squeezing the handle again. To start the cutting process, engage the clutch, pull back the throttle trigger with the index finger, place the bumper plate of the saw against the wood where you want to cut, and allow the cutting blade to make contact with the wood. At full throttle the saw feeds itself through the cut with little pressure on the part of the operator.

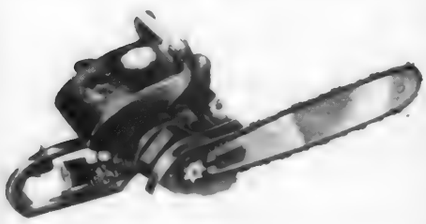
The man who has put in time at one end of a crosscut saw is in for some surprises when he first uses this power tool. He will find it to be lighter, a great deal noisier, and faster than he imagined. Since speed can be a hazard if not handled properly, the wise chain saw buyer will have the saw thoroughly demonstrated by the dealer from whom he buys, or by a neighbor who has already learned the ropes, before he sets out on his own.

"A chain saw can be as dangerous as the next farm machine, no more and no less," says Marshall Hord, who farms with his father, M. E. Hord, and his brother, Ernest, along the Ohio River near Madison, Indiana. "But when you get right down to cases, the ax that we've been doing our cutting with for centuries is one of the most dangerous tools in the world! A couple of years ago I was clearing some land when the ax slipped, slammed into my shin and laid it open to the bone.

NOTCHING A TREE for felling (top). For heavy sawing with the longer blades a handle is attached. Two men do a quicker and easier job. (Right) This bow saw is said to be less dangerous because half of the chain is covered. Bow saws are less likely to pinch.

GRAVELY: Chain saw attaches to Gravely tractor. Adjustable in any position. Blades are 24" and longer.

HOMELITE: A number of models with 4 hp. engines. Blades, 18" to 42", one- and two-man operation.

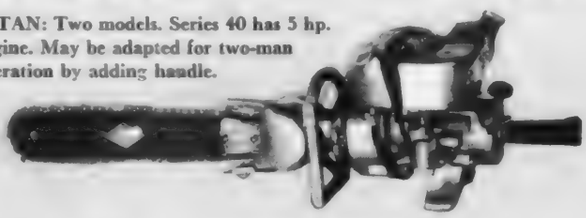


STRUNK: Built-in, no-kick-back feature. Cuts within ½" of ground. Two blade sizes, 19" and 24".

MALL: 3½ hp. and 5 hp. engines with 18" to 54" blades. Has bow saw and earth augur attachments.

DISSTON: This shows the bow saw attachment for Model DO-101. Blades range from 20" to 40". One- and two-man.

TITAN: Two models. Series 40 has 5 hp. engine. May be adapted for two-man operation by adding handle.



Doc took a look at it and said, 'That's a nice clean cut!' As far as I'm concerned, after using a chain saw for my cutting jobs for two years now, that's one of the few things that can be said in favor of the ax—it cuts clean!"

The Hords decided to invest in a chain saw after seeing a number of the tools exhibited at the fairs and having one demonstrated on their farm by a dealer in Madison. They chose a 4 hp. model with a 23" cutting blade, strictly a one-man saw. "What farm has two men available for cutting jobs these days?" is the way Hord puts it. "We have 400 acres here split up into three places. My father isn't too active any more with the heavy work and Ernest and I are usually working on separate places, so there wasn't much question but what a one-man saw was all we could handle. By getting a slightly longer blade, though, we could use it as a two-man saw by fastening on a helper's handle."

The saw has been particularly handy this spring, Hord says, and has gone a long way toward paying for itself. Fences on one of the farms needed to be completely rebuilt. With the chain saw they cut the 3000 posts needed in short order. These posts would have cost at least 40 cents each if bought and a comparable amount in labor if they had hired the work done.

"We were also planning to build a small pond back there at the edge of the woods," Hord adds. "The conservation man let me know one morning that he would be out that afternoon to start work. There were several big trees on the site that needed to be cleared before the caterpillar could get in to work. I had them cleared out by noon with the chain saw."

With buildings on each of the three sections of their farm, there are always a lot of repairs to be made, Hord says. With their chain saw and a little sawmill they have rigged up in the woods back of the house, they supply all the lumber they need for their own use, quickly and inexpensively.

"I think most of the trouble in handling a chain saw came before I got used to the 'feel' of the machine. It seemed mighty awkward at first. Even though it had been demonstrated for me, I couldn't seem to hold it just right. There is a real knack to using a chain saw right and that can be learned only with experience."

Chain Saw Technique

As Hord and many other chain saw users have discovered, there is more to using a chain saw than just holding on and letting it slice its way through a log. There is a real technique necessary to efficient and safe operation.

One of the first things to be remembered is that a chain saw cuts anywhere from three to ten times faster than a hand saw. Because of this the operator and saw must work as a team. Plan how the tree is to be felled, the direction of fall, and a get-away route beforehand. If two people are cutting, a set of hand signals might well be worked out, since the saw engine makes too much noise for conversation.

In preparing to cut timber in an area, clear away all the undergrowth from around the tree with an ax. Don't use the chain saw on small saplings because they may whip.

Begin the first cut with the chain saw bumper resting firmly against the tree. When the chain is in motion, its action will tend to pull the engine against the cut. If the bumper is not firm against the cut, the saw may be pulled violently from the operator's hands.

The undercut, or notch, furnishes a lever point for the tree and controls the direction of the fall, which will be perpendicular to it. The notch should be a quarter to a third of the tree's diameter. Clean out all the wood from it so the tree will fall true. When notching, brace the body against the motor frame so that if the saw binds and kicks, you will be shoved rather than struck.

The backcut is made about two inches higher than the bottom of the undercut. This felling cut should be parallel with the undercut. If the cutting is done properly, the tree will begin falling when only an inch or two of the holding wood is left. Do not cut through a notch: always leave a band of wood parallel to the notch for a hinge. Because the chain pulls the motor bumper tight against the tree, the cut must be made in an arc, pivoting on the plate.

If the tree settles back on the cut and pinches the chain, wedging will be necessary to open the cut and get the chain started again. Magnesium, aluminum, or wooden wedges are better than the old

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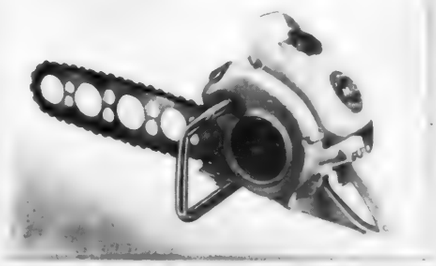
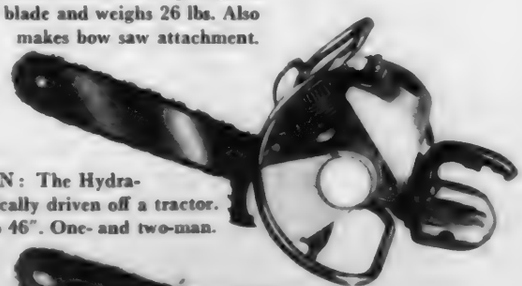


McCULLOCH: Blades range from 14" to 36" and a bow saw. Engine 3 hp. Small saw weighs 25 lbs.

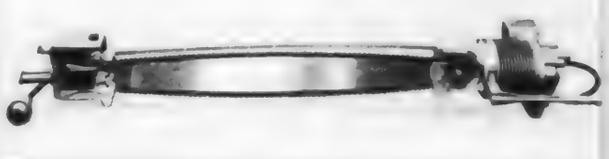
OFFCO: The Sawette, for clearing, pruning, and felling small trees up to 8". Has 12" blade.

LOMBARD: Woodlot Wonder, Model 30, has 3 hp. engine. Comes with either 16" or 20" blades.

CLINTON: Small model has 2 hp. engine, 20" blade and weighs 26 lbs. Also makes bow saw attachment.



VON RUDEN: The Hydra-Flex hydraulically driven off a tractor. Blades 18" to 46". One- and two-man.



REED-PRENTICE: Models with 18" to 48" blades, 3 hp. to 5 hp. Also makes air and electrical (above) drive saws.

The Sheep Beginner

The minor triumphs, the mistakes, of one who started from scratch

I am a part-time farmer who wanted a few sheep to clean up around my fences and keep the weeds down in a hill pasture and make money doing it. A couple of my neighbors have sheep and they talked up the idea of lamb in the deep freeze and how little care sheep are and how they paid for themselves with their fat lambs and wool. So I thought I would start in sheep—keep books on them, and a day-by-day memo for my own instruction.

Nov. 20: Now is the time to buy bred ewes, I figured, for prices should be lowest in the late fall when farmers want to unload surplus instead of buying feed for them all winter. I read sheep bulletins and books and made a nuisance of myself asking questions of old sheep men. Everyone said that Western ewes were rugged and prolific, so I started looking around for Western ewes. A livestock dealer at the other end of the county informed me that I had made my first mistake in sheep. "You're late," he said. "No Western ewes around now: they come in during the late summer: carload lots to the auctions and dealers." This was my first mistake—getting the leavings because I bought too late in the season.

Nov. 23: The county agent knew of a party who wanted to go to Florida for the winter and would sell his sheep—ten ewes and a buck. I drove over to see this person and looked at his sheep. The ewes looked good enough to my untrained eye, but the buck had large areas of bare hide on his back and flanks. "What happened?" I asked.

"He's much better than he was," the man said. "The vet cleared it. He had a rash. Some of his wool dropped off, but he's growing it right back."

"How much do you want for the lot?" I asked.

"Asking $30 for the ewes and $45 for the buck," he replied.

My intuition told me that the buck's ailment might be contagious and a beginner in sheep ought not risk bringing a disease on his place first thing. A dealer had told me that Western ewes of the best had sold for $25 to $30 that fall, so I figured that the man was asking too much for his animals. I told him I would think it over.

Nov. 27: My eye fell on an ad in the classified section of the county seat weekly.

FOR SALE: 13 good ewes and a buck. Two to four years old. Reasonable. Call Wm. Sims, Lakewood 2334.

I called Mr. Sims that evening and he said that I could see his sheep Sunday. In the meantime, I cleaned out what used to be an old loafing parlor in my barn and built a rough hay rack against the wall, and a feed trough long enough for fifteen or twenty animals and a boarded-off section at one end for salt. I found an old tub which I set under the water tap at the end of the feed rack and scattered a couple of bales of straw on the dirt floor.

(Above) The rubber band is thumbed off the elastrator ring above the testicles. The lamb has a few minutes of discomfort; the dried-up scrotum drops off in four to six weeks.
(Right) Early lambs seem to do best. Within two or three days after birth they can be turned outside with their mothers. Sheep should be under cover during heavy rain, which soaks their fleeces. Snow is shaken off.

Nov. 29: Sunday morning, and I went over to see Mr. Sims and his sheep. Mr. Sims had large red hands, a slow drawl, and an honest blue eye. I felt I could trust him. He said he was in the well drilling business and that's the way he had come by the sheep—he had taken them in return for a drilling job he had done for a neighboring farmer.

The sheep were in a lot by the barn. All but two were of good size. Mr. Sims said they were Shrops and a few had a touch of Hampshire in them. They were just sheep to me. The buck was a sulky, fat character who seemed short of breath.

"I'll sell you you these sheep right," Mr. Sims informed me. "Let you have them for just what I have in them—$20 an animal including the buck. I'll guarantee that all of them are bred and in good health. They're not more than three or four years old. If they don't turn out as I say I'll make it right. And I'll deliver them."

That seemed fair enough. I gave Mr. Sims a check for $280.

Nov. 30: Monday morning I drove over to the feed mill and had them make up a 9-1 mixture of phenothiazine and salt. Mr. Sims assured me that the sheep had been wormed, but all the books said to keep the pheno-salt mixture by them as a control. The mill had no legume hay, but they referred me to a dealer who sold me 20 bales of a mixture of clover, weeds, and old stubble. I paid $30 a ton for this hay, which wasn't what I wanted, but then there was no alfalfa or pure legume hay around. All the dealers said, "You're a little late for that stuff."

Mr. Sims and the sheep came that afternoon. They were crowded into the front end of a Ford truck. "I jam them in tight

when I'm hauling them so they can't slide around and get hurt," he said.

He backed up to the peach orchard gate and pulled them out, one by one. They all broke for the farthest corner and gathered in a group and looked back at us reproachfully. That is, all except the buck, who was as blind as a bat from a thick mask of wool which covered his eyes. He ran smack into a peach tree and was standing off, shaking his head and panting.

That evening I drove them into the barn, broke out a bale of hay for them, and threw out a dozen ears of corn. I wanted to make friends with them right away.

All but one or two of them had snotty noses.

This worried me, for a snotty nose couldn't be normal. However, Mr. Sims was not alarmed. "Snotty noses are occupational with sheep," he said. "Unless they get mopey, don't pay any attention to it." A memory of my very earliest youth was of my grandfather daubing tar on the noses of his sheep. I asked an old sheep man about this and he said it was an old-fashioned remedy and probably wouldn't hurt them.

That night I read up on snotty noses and learned they may be a symptom of head grubs if accompanied by blood. It is also the symptom of various types of worms and it can be preliminary to shipping fever.

I did nothing about the noses. Those that had them got better and some of those that didn't have them developed cases later on. But in my experience, nothing serious ever came of a snotty nose.

Dec. 1: I began to learn about the habits of sheep. My flock split up into factions and the factions split up into individuals. They acted as though they had not had any herd life, which made me suspect that Mr. Sims had picked them up, one here and one there. This suspicion was confirmed later at lambing time, and points up my second big mistake in buying sheep. My lambs were too far apart—the ewes had not been bred at the same time.

While at the start they all looked alike to me, two or three became individuals. There was Mrs. Murphy, now deceased. She had a long black face and sad-eyes. She liked people and apparently had been a bottle baby. She always came up for a handout, bossed the buck, and was a steadying influence. Then there was a wild one which had lost an ear. She was skittish of her own shadow and broke for the back of the lot at any sudden noise. She could see a dog a mile away and invited trouble by stampeding. Of course, being sheep, the whole flock stampeded with her—all except Mrs. Murphy, who usually remained calm and poised. The smallest of the flock was Little Sheba, so named because she swung her hips like Shirley Booth.

There was good grass along the creek and the slopes of the pasture had a heavy growth of fescue which had seeded out. I turned the sheep into this pasture by day and penned them at night. When it was snowing or raining I kept them up and gave them all the hay they would clean up and a small ear of corn once a day.

I ran into a great deal of contradictory advice on shelter. One old sheep man said, "Hell, what do you suppose that wool overcoat is for? Turn 'em out and forget about them." Another said that sheep could take snow—they shake that off—but that rain soaked their fleeces and invited pneumonia. I penned them at night until spring on the theory that they looked more comfortable. I reasoned that if I were a sheep, I would like a dry, warm bed.

When it rained or snowed during the day, they quit grazing and turned their rumps to the wind and looked unhappy. But they made no effort to seek shelter, even though the pasture was dotted with heavy, low-growing evergreens. There was an English type sheep fold on the farm—a cave built into the side of a hill and lined with stone. But the sheep shunned it also. I learned to love them, but I was never impressed with their intelligence.

They ignored the phenothiazine and salt mixture so I mixed a handful with their feed and they had to eat it whether they liked it or not. As a test I gave them some ordinary coarse salt and they went for it—they just didn't like the phenothiazine.

Dec. 15: Mrs. Murphy lost her appetite even though I tried her with straight mash and ground corn. Hollows appeared in front of her hips big enough to hide a grapefruit. Bob Adams, one of my sheep-keeping neighbors, said she might have worms. I called our vet, Dr. Beeson, at the county seat. He came over and walked all around Mrs. Murphy, looked at her backside and eyes, and gazed down her thoat.

"She could have a number of things wrong with her. My best guess is that she has complications aggravated by old age." He showed me her teeth and told me how to tell the age of a sheep by the teeth.

"After a sheep is five or six years old it's pretty hard to tell its age. This ewe is older than that, I'd say. She might have liver flukes or some other internal parasite."

"Is there anything we can do for her?" I asked.

"Since she is certainly not going to have a lamb, we'll worm her and put her on a diet. But don't expect too much. She's poorly."

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You can insert the naval cord in a bottle of iodine and douse it; or you can swab it with a ball of saturated cotton. This is always important, and doubly so in fly time.

Mrs. Murphy takes her last ride. Wracked by age and disease, she fought a gallant battle. She was given a decent burial under a pin oak on a pleasant hillside.

Bob Adams demonstrates the correct method of giving medicine out of a bottle — back the animal into a corner, insert bottle and drain contents. Keep fingers away from grinders.

A sheep usually ceases to struggle once you get all four feet off the ground. They may puff, wheeze, and roll their eyes, but they can't do much about it. Here Little Sheba's bag is examined a few days before she dropped twins. Although this is not a comfortable working position, it is practical for trimming feet, clipping around the bag, and a general examination of the animal.

TRACTORS AND FLOWERS are a familiar sight among the 200 acres of iris, peonies and daylilies on the Gilbert H. Wild and Son farms at Sarcoxie, Missouri. The flower crops on these acres gross more than $150,000 a year for a family that has been in the business for almost 70 years.

AFTER THE PLANTS get too high for the tractors, hoeing costs go as high as $1,000 a week. This is an all summer chore.

PEONY PICKERS take a breather when they reach the end of the row and load another three-hundred dozen buds on the wagon.

FLOWERS from the Wilds of Missouri

By Charles R. Koch

"FLOWERS from the Wilds of Missouri," it says on their catalog, but the only thing wild about this huge flower farm operation is the name of the family. The Wilds of Missouri use a string of tractors and modern soil methods as well as a huge coldstorage room in their handling of peonies, iris, daylilies, and daffodils. They are artists, whose medium is ordinary soil and a few hundred thousands bulbs from which they grow the blooms that splash color over 200 acres of the southwest Missouri landscape.

Like true artists, they make the work seem so simple that after a visit to their place, any farmer might be tempted to rush back home and get into the game. That is, until he begins to think about the tremendous management and labor problems involved in planting, cultivating, picking, digging, grading, packing, and shipping hundreds of thousands of plants, each of which demands individual attention.

Gilbert H. Wild & Son is the official name of the enterprise: the name is indicative of the tradition behind it. The son, Allen, has been the guiding hand in the business since the father's death in 1938. To start at the beginning, great-grandfather Wild came to the Missouri Ozarks from his native Germany back in Indian times. He began farming at a pleasant spot now called Sarcoxie. Twenty-two miles to the west was a plain that was later to become the site of the city of Joplin.

Great-grandfather stuck to his farming, but grandfather went astray one day when he invested $45 in some peony plants for his boy Gilbert. Gilbert was just a little tyke of eight years, but he had inherited a very green thumb and by the time spring came to the Ozarks three years later, he had a crate of cut peonies ready for market. A sign at the city limits of Sarcoxie boasts that it is the Peony Center of the United States. In those days, though, strawberries were its big crop and little Gil slipped his crate of flowers into a carload of berries headed for Omaha. A few days later a three-dollar check appeared in the Wild mailbox and Gilbert was seen strutting around town with the air of The Man Who Broke the Bank at Monte Carlo. That's the way the Wild family got into the peony business almost 70 years ago. Today peonies blanket 135 of their 665 acres of farmland, and there are 25 acres of iris, 25 acres of daffodils, and 15 acres of daylilies besides the peonies.

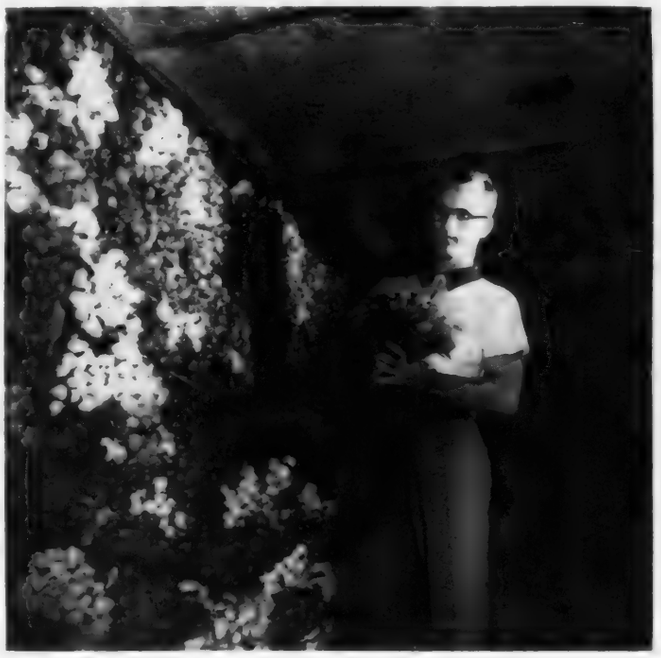
Family Affair

Gilbert Wild's two daughters are silent partners in the enterprise, but the actual operation of the farm is the responsibility of the Allen Wild family.

Short, stockily-built Allen is general factotum of the whole works. The set of his hat, with the upturned brim, cocked to the front of his head, is characteristic of the dynamism of this untiring organizer and manager. One moment he is in the iris fields on the "south" farm, in the peony plots on the "big" farm the next. No grass grows under his feet—nothing but flowers.

Haidee, who is Mrs. Wild, presides over the grading and packing operations; son Jim, with a degree in horticulture from the University of Missouri, understudies his dad, develops floral arrangements, meets customers and supervises shipping operations while he grows orchids on the side in his greenhouse.

Daughter Shirley Gene, a business administration graduate of the University of Missouri, is office manager, no small job in a business that grosses annually better than $150,000. She is largely responsible, too, for the growth of the Wilds' daylily business in the last few years. "Eight or ten years ago we only had about ten varieties of Hemerocallis, which is the fancy name for the daylily," says her father. "But Gene took a liking to them and got the rest of us interested and now we have over 500 varieties.



JIM WILD, third generation Ozark flower grower, checks the quality of a bunch of peony buds in the cooler, a refrigerated room with a capacity of 80,000 dozen flowers.

"Is wasn't so long ago," he grins, "that the kids were down in Owensboro, Kentucky, and I got a long distance call from them. 'Are you sitting down, Dad?' Gene asked. 'No', I said, I wasn't, but I could if she thought I should. Then she broke the news. 'We just paid $300 for a Hem,' she said. That kind of rocked me back on my heels. But actually it was a real good buy. It was Crimson Glory, a brilliant flower and a good seller. We're selling the offspring of that plant now for $15.00."

The only reason the $300 figure jolted Allen Wild was because it was for a daylily. For peonies he has paid as high as $2500 a plant. That's what it cost him to add the beautiful white Ann Cousins and the light pink Doris Cooper to his collection.

To most people peonies are just peonies; and iris, just a common posey the old folks used to call flags. But to breeders and fanciers each variety is an individual with a distinct personality. Wild's peonies list in his retail catalog from $1.00 to

"GOOD, TIGHT BUDS like these will ship well even after weeks in cold storage," says Mrs. Wild (left) as she helps one of the graders.

$80.00 each; his iris and daylilies run from 50 cents to $25.00.

These prices, of course, are for plants. Although cut peonies account for a sizeable part of the Wilds' business, the bulk of it is in plants. Peony plants are shipped in standard three to five eye divisions. Iris and daylily buyers get large sturdy plants of blooming quality.

Like all growers Wild is continually trying to breed new varieties, a tough job, particularly with the peonies, which may take seven years to develop from seed to bloom. "We've been trying for thirty years to breed a true yellow peony and we're not much closer to it now than we were when we started," Wild admits. "We may get one eventually, but when we do it will be a freak."

Many of the Wilds' old customers send them plants which they have bred themselves to try out in their plots and to propagate if they do well. The odds are greatly against any of these ever making the grade.

The Wild home grounds are well populated with "guest" plants, new and expensive introductions of other professional growers which are on trial. Many of the Wilds' introductions, too, have found willing "hosts" all over the country. After these newcomers have won the approval of the experts they are propagated and released to a plant-hungry public. This year the Wilds released three new peonies and six new daylilies at prices ranging from $8 to $50 each.

Exhibitions and growers' meetings play an important part in the life of the Wild family. Through these get-togethers they keep in touch with what their competitors are doing out in California or in Massachusetts, who is about to come out with something new, where they can pick up a sensational new beauty at the right price, and so on. The shows are the eyes and ears of the trade.

Why the Ozarks?

There is no particular reason why peonies, iris, and daylilies can't be grown just as well in most other parts of the United States as down in Wilds' corner of the Ozarks. They're all pretty hardy and no prima donnas so far as rich ground is concerned. They all like a soil with a pH of about 6.5, and the peonies, particularly the red varieties, seem to do better in a red loam soil. The iris like dry weather whereas the daylilies would rather see it a bit on the wet side. Those conditions, in general, can be duplicated easily enough in most part of this big country. But it's the hours of sunlight that induces the peonies to come into bloom at just the right time for the two big May holidays, Mother's Day and Decoration Day. The hours are just right at Sarcoxie. That wonderful timing of the spring sun, not too early and not too late, is worth $60,000 a year to the Wilds in cut flowers.

FOREMAN BUMP STOTTS plans tomorrow's work as he picks peonies with one of his crews.

Picking Time

Peony picking starts in late April or early May. While it never lasts more than a month, it is one of the most spectacular operations on the farms. In good years as many as 100 men take to the fields at six in the morning under the watchful eye of the foreman, Bump Stotts. Divided into crews of about 20 each, they range up and down the endless rows of whites and pinks and reds, grasping the buds by the heads and cutting the stem near the base of the plant. No more than two-thirds of the buds on any one plant are picked and only those with stems long enough to lift them well above the body of the plant. Nothing is cut that is showing a tendency to open, for buds may be in storage for several weeks before they reach their final destination. Open blossoms won't keep.

The cutters, who this year were paid 75 cents to $1.00 an hour, are recruited from Sarcoxie, Reeds, Wentworth, and other neighboring towns. Bump knows them like an army of brothers.

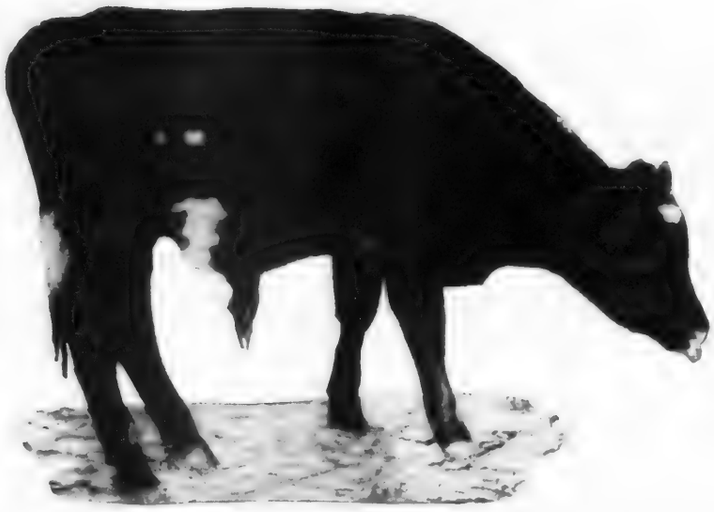
"Buck Massey there is a great one. Buck's 75 years old, a retired railroad hand. Gets a good pension, but he gets the fidgets is he isn't busy. About a week after he left the railroad he saw Mr. Wild in town one day. 'Allen', he says, 'sharpen up a hoe for me; I'll be out tomorrow.' And he's been working here ever since. Does as much work as three of these younger fellows.

"We've got our share of winenoses around here, too," Bump goes on. "Those guys are good workers but you've got to pay them every night. They drive Miss Gene crazy goin' in there to get their money all the time. Then sometimes they won't show up for days at a time, just when you need 'em most.

"Some of these guys don't want to do anything but dig greens and go fishin' or huntin'. Deke's a fellow like that. Last year right in the middle of the cutting season we were really up to our necks in work and were going to have to cut on Sunday. Mr. Wild pays time and a half on Sundays and Deke has 12 kids

(*Continued on page* 126)

ALLEN WILD, co-owner and general manager of the big flower farm, pauses to pollinate an iris bloom. Directing the planting, cultivating, picking, digging, packing, and shipping operations of the farm keeps him pretty busy even when he doesn't have to worry about getting out the catalog, meeting customers, and preparing advertising.



Shipping Fever

By Joann Bell Pierce

Each fall when cattle are shipped to the nation's feed lots, hauled from market to farm, or make the rounds of the stock shows, an invisible but savage rider goes with them. This unwelcome guest is shipping fever. For years he has played a successful game of winner-take-all with the stockman, cutting out a sizeable slice of the profits. A cure or a sure-fire preventive for shipping fever is still in the realm of the unknown, just as a cure for the common cold. But common-sense handling, immunization, and a quick call to the veterinarian when symptoms of the disease first show, can keep losses to a minimum.

Technically called hemorrhagic septicemia, or Pasteurellosis, the germ first was isolated by Pasteur and, in the form in which he found it, was a blood poisoning accompanied by hemorrhages. Shipping fever is principally a disease of cattle, but also may occur in sheep, goats, horses, swine, and fowl. Its primary cause is not known, but the disease itself is highly infectious, moves in fast, and usually strikes an animal when he's worn out from a long haul.

On the subject of what causes shipping fever of cattle, practicing veterinarians and research workers alike are divided into two camps. According to the older school of thought, the principal factor is the hemorrhagic septicemia germ. The theory is that these bugs, which are present in large numbers in infected animals and in the air passages of healthy animals, become virulent under certain conditions and that the animals harboring them readily develop shipping fever when their natural resistance is lowered.

The newer school of thought believes the hemorrhagic septicemia bug plays second fiddle to another infective agent, probably a virus, moving in after the virus paves the way by breaking down the animal's resistance. According to this theory, then, the secondary complicating factors could be a number of bugs including the hemorrhagic septicemia organism, streptococci, staphylococci, E. coli, and so on, varying with the section of the country. The disease would then take several forms, which it does—lung, edemic or subcutaneous, and intestinal, depending on which of the complicating bugs move in behind the virus.

VACCINATION with either bacterin or serum is protection, but not a sure preventive against shipping fever. The bacterin takes about 14 days to build up resistance; serum protects the animal within a few minutes.

As shipping fever establishes itself, the outward symptoms are somewhat like those of flu in man. First an animal will start to droop, go off feed, and its temperature will shoot up to 104° to 107°. There may be an occasional hacking cough, difficulty in breathing, swollen and watery eyes, mucus discharge from the nose, and diarrhea. The tongue may be swollen and the animal will drool or slobber because the throat and tongue are irritated. It becomes gaunt and crestfallen and its gait stiffens as though from aching joints. It has a tucked-up look in the abdomen and flanks as though from colicky pains. Soft swellings may appear under the skin of the head, throat, and dewlap, which pit on pressure. There may be occasional spasms.

An acute form of the disease may kill a calf in 24 hours. In other cases, within three to five days after the first symptoms appear, affected animals may develop pneumonia and die in 48 to 72 hours, or the disease may take a chronic course and the sick animals linger on for weeks. Cattle may recover from very mild attacks in a week or two.

It is difficult to diagnose shipping fever definitely because of its similarity to other diseases. Because of its acute course, high fever and rapid termination, it may sometimes be mistaken for anthrax, malignant edema, blackleg, or some form of poisoning. At any rate, diagnosis and methods of control in outbreaks should be left to an experienced veterinarian.

It is not known just what part the contamination of yards, buildings, and equip-

ment by infected animals, or contamination brought in from other infected places, plays in setting up the disease in a herd, but undoubtedly this is a source of danger. When making replacements in the dairy herd or fresh additions to a lot of feeder cattle, isolate the new cattle from the old stock for at least 10 days.

Weaners and short yearlings are particularly susceptible. They have had little opportunity to build up natural immunity to diseases of any sort and therefore fall easy prey to infection, especially where upsets in regular routine already have lowered their resistance. Heavy losses also may occur in animals assembled at shows and sales, or on the home farm when these animals are placed with other stock. The new additions may be sick on arrival, may come down later, or may remain well and serve only as carriers to infect other stock.

Over-crowding, over-fatigue, over-filling, and over-exposure are part and parcel of shipping and they all contribute to creating the conditions which the shipping fever bug, whatever it is, finds just to his liking. This fact is one of the few sure things that is known about the disease.

"Common-sense handling at the ranch, at the market, and at home, especially of calves, can eliminate 90 per cent of the trouble with shipping fever," says Ray Cuff of Kansas City, Regional Manager of Livestock Conservation, Inc. "Here at the Kansas City Yards, we have noticed repeatedly that loads with over 10 per cent more cattle of a given weight than recommended by the Western Weighing and Inspection Bureau always have the largest percentage of sick or dead animals at arrival, or within two weeks after arrival, at the feed lots. To avoid over-crowding in a 36-foot car, use 50 head of 400-pound feeders, 36 head of 600-pound stuff, or 30 head of 800-pounders. For a 40-foot car, increase these figures about 10 per cent. We think it pays to pay

(*Continued from page* 130)

WHEN A YOUNG ANIMAL looks droopy, like the one on the opposite page, take its temperature. If it has a fever, better call the veterinarian. The calf, below, died of shipping fever because the dairyman thought, "It'll be all right tomorrow". Prompt treatment with the new drugs can save most sick animals.

Points *for* Plowmen

By George Laycock

THERE'S more to using a moldboard plow than turning the landscape topsy-turvy. Plowing is still the basis of good cropping and few will argue with the adage that he who plows poor reaps little. A plowman can improve his plowing and with proper attention to details can turn furrows straight and neat as a plowing champion's dreams by selecting the right tool for the job and then learning how to use it best.

First, let's take a look at what we're asking the plow to do. It is asked to cover all vegetation which adds richness to the soil and to keep plant material from messing up the tools that follow. It is also expected to loosen the soil, break up lumps and crusts, mix the soil thoroughly, and even deepen the seedbed. When it has finished this work the plow has paved the way for roots to grow freely, get air, moisture, and plant food without bumping into clods and spots of lifeless soil. The plow can do all these things if the soil is good to start with.

Briefly, the way a plow works is that it slices off a strip of earth, lifts it, rolls it, pulverizes it, and puts it back top-side down. It is the moldboard, the curved metal plate that breaks up the soil; the strip of soil following its curves is fractured by stresses and strains.

From the drawings in the pyramids we know the Egyptians used a crude plow, hitched to oxen. The English introduced wooden plowshares which were eventually faced with steel; finally we worked the curves of the moldboard to get the kind of furrows we wanted. Something over 12,000 types of plows have been patented and their inventors have had high hopes of raising bigger crops, making the pull easier, or of getting rich. Today the field has been narrowed down to about a dozen, one for most every soil condition.

Plows

General Purpose. This is the most common moldboard plow. It is versatile enough to do a good plowing job on a variety of soils. Because it will turn sod, stubble, and meadow, it's a good plow for rotation farming. It will even do a good job on heavy gumbo or loam soils if they are not too wet to break up when they're turned.

High Speed General Purpose. Here is the most versatile plow bottom in the lineup. It is designed to do a good job of plowing at the high speeds usually needed to turn sod or stubble. Fitted with stony land shares this is a good one for the rocky slopes of Eastern states. Fitted with a 10-inch share it will stand furrows up on edge for better drainage in clay soils.

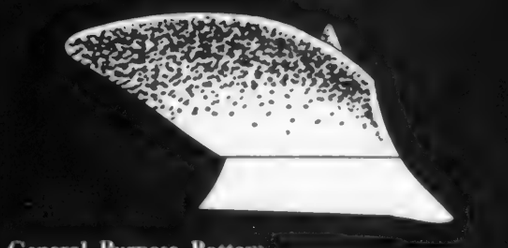
Special General Purpose. This one is designed for clay soils and soils of volcanic origin in the Northwestern part of the country. It does well on heavy clay and will turn over loose soils which other plows let fall back without turning.

Stubble Bottom. This plow is a short one with a sharply curved moldboard. It's especially good in small grain or corn stubble where it does a good job of breaking up soil and covering trash. It is not a good plow for turning under meadows or traveling at high speeds.

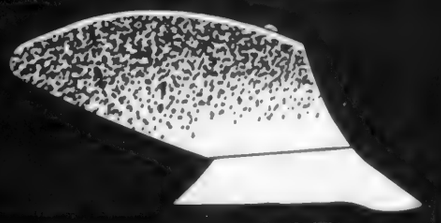
IN FEBRUARY there is usually a week when the plow seems to glide through the ground, as if it were glad to be back at work. It puts a gloss on the top of each furrow and down underneath the soil crumbles into place.

Blackland Bottom. Here's one made for the stiff, sticky gumbos. It has less area than general purpose plows. It scours well in sticky soils and can do a good job of turning and covering at speeds up to four miles an hour. This one won't do a good job of turning under sod.

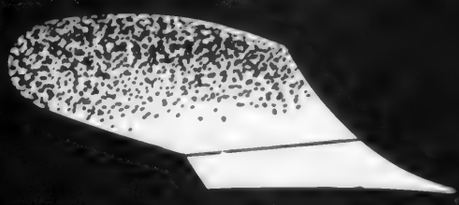
Slat Bottom. The stickiest, toughest soils that won't scour from the blackland bottom can often be handled with the slat bottom plow. It has one third less surface to hold the soil, because strips of the moldboard have been cut away. If this plow



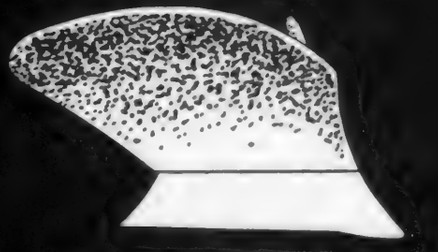
General Purpose Bottom



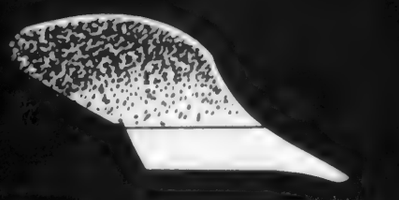
High Speed General Purpose



Special General Purpose



Stubble Bottom



Blackland Bottom

Slat Bottom

Chilled Bottom

fails to scour in wet soil there's no other moldboard to do the job.

Chilled Bottom. These are made for sandy, gravely, and flinty soils. The steel is treated for long life under these conditions. The plow resembles a general purpose plow but it does a fine job of loosening the soil and letting it fall and crumble in the furrow bottom.

Whatever you plow, the sharper the curve in the moldboard the more power it will take. The shorter plow bottoms with the deep curves do a better job of pulverizing soil but they offer more resistance to the furrow slice, throw the soil farther and consequently call for more power than those with shallow curves.

With the plow selected you can still choose between cast and steel shares to further adapt the tool to the job. The share consumes about 60 per cent of the power required to pull a plow in cutting the bottom and wall of the furrow. Steel makes the best plow point for most Midwestern soils. Equipment dealers stock cast shares, too, and they sell at about two dollars less than the steel, but usually this is false economy. The cast point breaks more easily against a rock or stump. Steel scours better than cast. The cast share does its best work in sandy or gravely soils that wear steel shares down fast.

The newest in plow shares are the throw-away points, usually bought several at a time and discarded when they get dull. These cost between two and three dollars each, only a little more than a blacksmith charges to sharpen the point—if you can find a blacksmith. These expendable points have their place because with rubber tires and higher speeds have come broken points. Even with break-away hitches, the momentum of a plow hitting a rock at high speed will often break a point.

Sharpen the Share

The plow deserves good care. When it's not in use, especially between seasons, the unpainted parts should be coated with a heavy oil or rust preventive.

Plow points are not resharpened as much as they once were, but if your shop is equipped with a forge and anvil here are a few plow sharpening pointers to keep in mind. For solid steel or soft center shares, heat the point to a cherry red. Don't heat the entire share, just the cutting edge and as much of it at one time as you can sharpen while it's hot. The whole cutting edge should be sharpened by hammering on the top side until it is drawn out to a sharp edge. If you get the point too hot the steel loses strength. After sharpening, a solid steel share is ready for work again, but softer center shares should be hardened. Do this by heating the entire share to a cherry red and holding it, cutting edge down, in a bucket of cold water.

"You can tell best when to change points by looking at the furrow," says Martin Cummins, 1952 national contour plowing champion, of Lewiston, Ohio. "If the plow's not cutting as deep as it should, not lifting the furrow slice right, or pulls too hard, and you know it's adjusted right, you'd better change points. You'll save money on power and get a better job."

Cummins started plowing as a boy walking behind a team of his father's horses. "Plowing always fascinated me," he says, "and I always figured a good job of plowing is the first step in getting a good crop. Take a look at this field I just finished out behind the barn. There was clover there a foot high and thick as hair but it's covered up now. Another thing you'll find in a good job of plowing is that furrows are separated by a small V. And furrows should be straight unless you're plowing on the contour. You should be able to follow a furrow down the field with your eyes as far as you can see."

Plow Adjustment

Before a plow can do a good job it must be properly adjusted. Good adjustment also means less wear on the plow and a saving in fuel. "The place to adjust the plow," says Cummins,

OPEN a land as shown in the diagram above. After it becomes too narrow for easy, sweeping turns open up another land. Then plow alternately in each land until the first one is finished. The third land is opened when the second becomes too narrow.

"is in the field after you've opened a furrow, and with the tractor and plow in the furrow." The main adjustments are the hitch, rear wheel, colter, and depth and leveling controls. There are few things on a trailing plow that can cause more troubles than a poorly adjusted hitch. If the plow skids on its nose, won't stay in the ground, won't scour, makes furrows with uneven ridges, pulls too hard, or leaves a ragged furrow wall, the trouble is probably in the hitch.

With a good hitch there is a straight line from the point of load on the plow to the point of pull on the tractor. The tractor's center of pull is a point about three inches ahead of the rear axle and half way between the wheels regardless of their setting. To find the center of draft on the plow, measure the plow's total cut and divide it to get the center of cut. Measure to the left of center of cut one fourth the width of one bottom to get the center of draft. There should be a straight line from the center of pull to the center of draft. If the plow isn't pulling straight it can be adjusted by moving the hitch to left or right on the tractor drawbar.

It's a good plan, too, to measure the width of the furrow to see if the plow is cutting the right amount of land. Moving the hitch to the left cuts more land, to right cuts less. Every half inch adjustment on the drawbar changes the width of the furrow about an inch and a half.

One way to get the horizontal hitch right is to first set the plow hitch in center position on the tractor drawbar and start a furrow. If the plow is pulling to one side too much, remove the drawbar pin, let it adjust to the line of draft, and lock it again at the nearest position.

Vertical adjustment of the plow is also important in getting easy, level pull, less wear, and lower fuel consumption. The point of hitch should be on a line between the center of pull and the center of draft. You can take a look at the rear wheel of the plow, and tell if the drawbar is raised too high. Pulling down too much on the drawbar lifts the wheel off the ground, makes the plow ride its nose, causes a loss of suction, heavy wear on machinery, and gives a sorry looking furrow. Correct this by adjusting the drawbar guide until the rear wheel rides smoothly on the bottom of the furrow. On most plows this adjustment holds the heel of the landside from rubbing heavily either on the bottom or the wall of the furrow. You can check this rubbing by feel: if the landside is hot from rubbing the furrow wall, the tail wheel or hitch needs some attention. The three difficulties which most often cause the landside to rub are (1) excessive side draft—which can be corrected at the hitch, (2) tail wheel axle bent or not correctly adjusted, (3) wheel bearing worn and needs the slack taken up—directions for this operation are in instruction manuals.

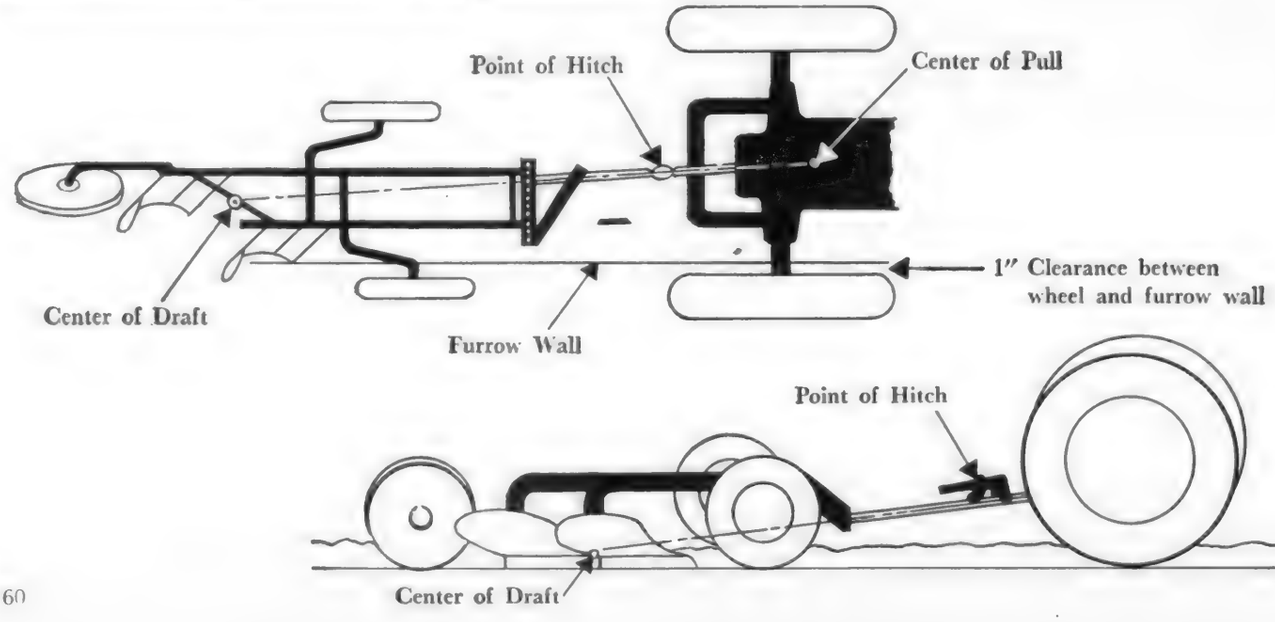
Plows are designed to work at their greatest efficiency when plowing at a depth one half the width of the bottom.

Take a look at the rolling colter, too. Its main job is to cut trash and it should be set just deep enough to do this job. Set too deep, it may keep the plow point from penetrating and gather trash as it travels. The lighter the soil, the deeper the colter must be set to cut trash, but in light soils penetration is seldom a problem. "The colter," says Martin Cummins, "should be set so there is a half inch space between it and the landside of the plow to get a clean furrow wall." Where scouring is a problem or furrow walls crumble, set the colter wider. When colters clog up with trash, try setting them forward. Setting them back further will give greater penetration. "Better get new colters," says Cummins, "when they wear down where they won't cut trash without clogging up."

Getting At It

There are a lot of ways to plow a field and most plowmen have their pet plans. The size and shape of the field, whether it is rolling or level and whether or not it is fenced, usually figure into the job. One good plan where size and shape of the field permits, is to mark off the headland first by turning a furrow in all the way around the field. This furrow should be in from the edge of the field about twice the length of the tractor and plow if you are using a trailing plow. The headland can be narrower for attached plows because they take less room for turning. Furrows should be started by dropping the point of the first plow at the wall of the dead furrow and lifting the plow when the next to the rear bottom reaches the dead furrow. After all the lands have been plowed, start at one corner and plow

THE DIAGRAM below shows the correct hitch for a two-bottom plow. Time spent in adjusting for the right hitch will save gasoline and tires and do a better job of plowing.



HILLY GROUND adds to the plowman's problems whether he walks behind a team or rides on rubber tires. Before the days of terraces he ringed the hill for easier pulling.

out around the headlands until the field is finished. The time to open a new land is when the turns become too sharp to maneuver easily.

The trickiest plowing in each land comes in the opening and closing furrows. "A lot of plowing is done too fast to get a good job," says Martin Cummins, "and especially on the opening furrows. Better take it easy and get a good job. You can tell how your speed is by the way the furrow turns. When you're opening a new land, the ground has no place to fall into the first time through, and you don't want to throw it out flat. When you come back, the return furrow should be put up against the first one just tight enough to make them look like they're buckling the least bit. You don't want 'em to crack and you don't want 'em to lap. And you want the opening furrow just high enough that after one trip over with the disk you won't be able to see where the land was opened. On the second half of the opening furrow I keep about a third of the furrow tire on the plowed part."

Cummins is always casting ahead when he's plowing a land to see if bulges are showing up. He tries to spot them early enough to bite into them a little each round and leave the last furrow even all the way across the field to avoid going back for short rows.

The last time through on the dead furrow he plans to plow as shallow as he can and still cover trash. He plans for his dead furrows to fall in different spots every year.

On poorly drained soils, where plowing helps establish surface drainage, the lands can be narrower and the dead furrows deeper, to carry off water.

"Plowing on the contour," says Cummins, "is a harder job than plowing straight rows. You have to be careful on the tight curves to get your furrow slices the same width all the time." Here the first furrow is especially important. It has to stick to the contour line and every

(*Continued on page* 141)

For a basic white loaf, add 1 package yeast to 1 cup warm water. Dissolve. Mix and add 1 cup scalded milk, 2½ teaspoons salt, 3 tablespoons sugar, 6 tablespoons shortening.

Add 3 cups sifted flour, beat until smooth. Stir in another 3 cups flour. When the dough forms a ball and comes away from the sides of the bowl, turn out on a floured board and knead.

Home-made Bread

By Alden Stahr

Place kneaded dough in a greased bowl, cover and let rise in a warm place until double in bulk. Punch down, pull the sides into the center and turn out on a lightly floured board.

To knead dough, flatten it slightly. Fold it over itself toward you, then push away with the heels of the hands. Keep turning the dough and repeating this action until it is smooth.

To shape the dough into two loaves, cut in half and press each piece into an oblong 9x8x1. Using both hands, fold each end of the oblong to the center, pressing down firmly.

Bread making is not a big chore. The product is cheap and tasty.

A friend stopped by the other day just as we were taking a batch of bread from the oven. When he saw those chestnut-brown loaves and smelled the rich nut-like aroma, he smiled as though he had seen an old friend. "That looks just like the bread my Aunt Vinnie used to make," he said.

"Aunt Vinnie lived down the valley from us when I was just a lean age boy," he went on, "She baked bread every day in the last of the Dutch ovens I ever saw in action. It was a brick affair out under a shed. She would build a big fire in it, getting the brick hot. Then the fire and ashes were all raked out, the place filled with the loaves of bread, and the door tightly closed. As an oven that fireless cooker did a job that has never been matched.

"The tough-crusted, pully-mixed bread she baked was tops in eating for me. When, eventually, I would leave she always cut a crescent shaped piece from the side of a new loaf, pasted the holes full of fresh-churned butter, overlaid that with blackberry jelly, then send me on my way toward home. The road to Paradise could be no sweeter than that path through the pasture was then!"

Like Aunt Vinnie, we bake our own bread at home almost every day because we discovered long ago that store bread bears little resemblance to the substantial, satisfying, aromatic home-baked loaf. Besides smelling wonderfully good, home-made, whole-grain bread is unsurpassed for nutrients.

Making a Whole-Grain Loaf

Who bakes the bread these days? They say it's a man's job, gentlemen, for almost all professional bakers are men. But in our house, most often I start a batch, work it into a dough ready for cutting, and my wife takes it from there.

I'll emphasize in the beginning that temperature is important in baking and it's worthwhile to use a thermometer consistently. Aim for a dough temperature of 80 degrees. To get this just right, the temperature of the water, the flour and the room should all be considered.

But come along on a typical baking day. We usually knock out 24 loaves at a time, but our formula can be broken down to meet your own requirements. Here's how we make it:

I draw one pint of water at 90 degrees because the room is about 70 degrees. Then I crumble one-half pound of moist yeast in and pour in one cup of honey, stirring until the yeast is dissolved and starting to grow rapidly. You can actually see it grow. This mixture goes into the mixing bowl together with 5¼ quarts more of water at 90 degrees. I stir it about a minute or two and then add a half cup of salt.

Then comes the flour—100 per cent whole-wheat as it comes from the mill. No white flour or anything else is needed, just the straight stuff. Since this batch is 24 loaves, I add 24 scoops of flour, each weighing ¾ pound. With water absorption this makes 24 loaves at 1¼ pounds each.

The dough is kneaded for about eight minutes or until the gluten is well-developed and the dough is firm and resilient. We used to do these big batches by hand. Believe me, its a real workout with about 30 pounds of dough to flip around. Then we got our Hobart electric dough mixer. You can also get old-fashioned bucket-type dough mixers if you like. Phil Wells, in Haddon Heights, New Jersey, makes them and sells them as well as steel-burr flour mills.

After mixing, the dough is allowed to raise in the mixing bowl until the volume is double. This should take place in a spot where the temperature is even all around, or you'll be cursed with uneven fermentation—the top of the loaf will collapse, or there will be a cavern under the crust.

After it's raised, the dough is dumped out on a floured table and rolled out long so it may be cut into 1¼-pound chunks and shaped into loaves. Weigh the chunks on the kitchen scales if possible. You'd be surprised how important it is. Too much dough and it rolls over the sides of the pan. Too little and it looks like half a loaf.

We like to work with a small pan—3¾" x 7½" x 2¼" deep—sometimes called a loaf-cake pan. If you make a lot of bread, though, it's wise to get strapped pans, that is, six or more pans fastened together with metal strips and spaced so that heat is evenly distributed. Grease the pans to prevent the bread sticking, then fill about three-quarters full with dough. Grease the tops of each loaf or sprinkle with water to prevent too hard a crust from forming, then cover with a cloth to prevent drying out while rising. Raise about an hour in a warm room where the heat is evenly distributed.

Then into the oven with it!

Oven Lore

Here's a tip a baker gave us recently about the use of our ovens. Directions for baking call for a 350 degree oven. All right, you put in 30 pounds of dough at 80 degrees and what happens? You reduce the temperature of the oven so much that, even though you followed directions, the bread is not properly baked. So this baker told us to start the oven at 400 degrees, put in the loaves and keep the oven at

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Grade AA Eggs

Premium quality in eggs is a fleeting thing--here is how farmers maintain it

"Ninety per cent of all eggs laid would grade AA, the top, if—"if', I say—they were graded when they were laid," a State-Federal Egg Grader said recently. "The way they are handled from then on can keep them in double A condition or drop them right down to a grade C or into the dirties or check group. The difference will run from 10 cents to 15 cents a dozen or $3.00 to $4.50 a case. You might say the difference is between making money at poultry or going bust."

So few farmers keep their eggs in top condition that most markets today don't even grade out AA quality eggs. In Ohio, for instance, only 6 out of 35 inspected markets sort out the AA grade and these markets find that eggs which qualify for the top grade run from 5 out of 100 to 2 out of 1000.

Eggs are graded by USDA standards according to size, color and interior quality. Egg size and color seem to be almost entirely the result of the bird's breeding—though feeding does influence size to some extent. Interior quality, the way the egg looks when it comes out of the shell, is also influenced by breeding—blood spots and firmness of albumen are both characteristics which are affected by breeding—but the most important factor is the way the farmer handles his flock and the eggs. There is no test of flavor that is regularly applied, but complaints to a market about off-flavored eggs will bring about a search for the producer who is storing his eggs near the kerosene or onions or whose egg room is musty.

Many markets use the United States Standards and Grades set up by the Department of Agriculture. These standards call for a separation of the eggs according to weight and another grading according to the quality of the egg inside the shell. Weight grading is by the weight of a dozen and is stepped down in three ounce steps from Jumbos, which weigh 30 ounces or more per dozen, to Extra Large, Large, Medium, Small, to Peewee which must weigh 15 ounces or more per dozen. The eggs are also graded according to shell color—brown for the Boston market, which supplies New England, and white for New York and most of the rest of the country. Dirty, cracked or checked eggs are put into a discounted group. The quality grades range from AA down through A, B, and C, depending mainly on their interior quality. These quality grades are the ones the farmer can control.

The interior quality of the egg is examined in the dimly lit room of the egg candler. By spinning the eggs in a spot of bright light the candler can see the air cell, the shadow of the yolk, and any blood spots which might be present. AA quality eggs must show a clean, unbroken, normal shell; an air cell of less than ⅛ inch depth; a clear, firm white which holds the yolk well centered and thick enough so that the outline of the yolk is not well defined in the candler's light; a yolk which is free from blood spots or blemishes.

The eggs drop from AA down to Grade C as the following signs of deterioration take place: (1) the air cell increases in size, (2) the egg white becomes thin and watery, (3) because of the thinner white, the yolk shadow appears more distinct and is not held firmly in the center, and (4) the shell is less perfectly shaped. This last is not a sign of deterioration nor is it a sign of poor quality, but housewives object to bumps and blemishes on the shell and so they must be perfect to grade

AN EGG GRADING MACHINE separates the eggs into market sizes. The eggs are candled as they go into the machine by Omer Smith; Mrs. Smith packs them.

AN EGG WASHER maintains egg quality and cleans them faster than washing by hand. The water contains detergents.

AA. As the grade is dropped, the price drops, too, at the rate of about 3 to 5 cents a dozen for each downward step.

Omer Smith Keeps AA Eggs

One poultry farmer who has no intention of missing a single penny of possible profit from his chickens is Omer Smith, whose 360 acre farm near Hagerstown, Indiana, is made up of four small farms acquired over a period of decades and welded into a single operating unit. Although Smith raises about 30 dual purpose cows and grows 100 acres of corn, everything on the farm is geared to the poultry project, right down to his dog, Kansas, who, according to Smith, can cull chickens better than any man on the farm.

Smith, who is short and heavy-set, is getting a good sprinkling of grey in his stubbly hair and is not as agile when it comes to culling pullets on the range as he once was. His solution was to buy Kansas, a sheep dog, and train him to catch a chicken when it was pointed out to him. Kansas soon learned that it was always the chicken with the limp or the drooping wing, the chicken with the wry neck or the pendulous crop that was the object of his chase. Now Kansas goes out on pasture with Smith and singles out any poor doers from the flock. "Kansas will worry any lame or droopy bird out of the flock and keep pointing at them and looking up to me until I give him the word to get them or leave them be," Smith says. "When I tell him to catch them, he darts in and grabs them and brings them back to me without injuring them. He has never yet killed a bird or showed signs of wanting to hunt them on his own."

All of Smith's pullets spend a few months on his alfalfa-ladino pastures, but when autumn comes they are moved into the laying houses and say goodby forever to fresh green feed. Smith feeds dehydrated alfalfa and ladino in his laying mash, but too much green feed tends to make the white of the egg watery and makes the yolk dark, so green stuff is rationed to five per cent by weight of the laying mash.

Smith and his family are hard-working, plain-spoken Quaker folks who believe in conserving the value in everything they use. Their hen houses are four converted barns with floors added to change a barn and hay mow into a four-storied laying house. "Sometimes, when I've seen some of the big eastern poultry farms," Smith said almost wistfully, "I could hardly keep from building me a modern laying house for our ten thousand chickens, but then I see how much good there is left in these old buildings and I just can't bring myself to do it." When the deep litter piles up over the years in the low-ceilinged laying pens, Smith, with his stubby build, is one of the few men on the farm who can walk around the coops upright without banging his head on the rafters above.

FREQUENT EGG GATHERING is the first step in preserving fresh egg quality. As soon as they are laid, the eggs roll gently onto the clean, cool tray in the front of the roll-away nest.

Though deep litter conserves labor and produces a healthier flock, it can play hob with the egg check when it gets wet, for dirty eggs are discounted. To keep the litter dry, Smith has set his drinking fountains in the center of a curtained-off four-foot wide, drain board. To get to the float-controlled water trough, the chicken squats under the curtain, which is spotted with drops of water thrown there by drinking birds; to get out she goes under the curtain again, losing that last drop of water from her beak or wattles.

Dry litter is not the only precaution Smith takes to keep the eggs clean. His nests are wire bottomed with enough of a slope so that when the egg is laid it will roll out from under the hen onto an extension in front of the nests. Smith had a good deal of trouble getting the hens to use these nests until he discovered the trick of pushing straw beneath the wire net bottom to make them seem more like the nests mother used to make. Now the hens take to the cool, dark nests without hesitation. Much this same solution was reached by Kenneth Rupp, of Seville, Ohio, in getting his old hens to use the Eggzit roll-away nest. He believes that if pullets are *started* on these nests you won't run into such resistance.

Still another effort to prevent dirty feet and dirty eggs is the provision of plenty of roosting space over dropping pits. Smith uses long, three-tiered roosts made of two by two lumber set up over a wire net-covered pit. The birds wake up in the morning with clean feet—though sometimes their back and tail feathers are spotted by their upstairs neighbor.

Partly to insure clean eggs, but more to be sure that they are fresh, the eggs are gathered three times a day and stored in a cool moist place. Heat and dryness are

(*Continued on page* 93)

Run It Through Twice

By C. Chester Charles

No animal is as earthy as a hog: he delights in rooting in just about anything. And he gets fat doing it, for he is wiser than his critics—he recognizes a vitamin when he sees it, whether it is in a self-feeder, a garbage heap or the fresh droppings of a steer.

We are now beginning to learn a lot of things that swine found out for themselves a long time ago.

"The hog is a smart animal," says Bill McGinnis of Kingston, Ohio. "He knew all about vitamins and unknown growth factors and amino acids a thousand years before we did. His instincts told him that good things for him, other than undigested grain, come through the digestive system of a steer."

The hog himself, unconscious of his reputation, grunts at the chance to fill his belly and his owner's purse on animal waste, even though yellow corn is there for the taking in a nearby feed trough.

"Hogs following cattle made money for my grandfather and for my father and they are making money for me," says McGinnis. When Bill's great, great grandfather brought his bride on horseback from Pennsylvania to a log cabin in the Ohio country in 1803, he naturally followed the custom of feeding older cattle to a heavy weight on shock corn. Hogs, through design or lack of fencing, managed to fatten on the undigested corn kernels that the steers always left behind them. And a hog has never yet turned up his nose at a slobbered ear dropped by a greedy but fussy beef animal.

"We used to figure that feeding shocked corn or broken ear corn meant two pounds of hog gain for each bushed fed the cattle," McGinnis says. "Ground feeds are digested better by the steers and the hogs like the waste of this, too. The idea that they pick out only undigested grains is a superstition.

"In the old days when nobody fed supplements to hogs, they got what was dropped from one end of the steer or the other and sometimes a little corn was fed them direct and they did well, too."

With the coming of silos and the demand for lighter weight beef and, later, the use of ground feeds, there was less *noticeable* waste than the feeding of ear corn made obvious.

"Lots of folks hereabouts, and everywhere, I guess, gave up running hogs with cattle when they couldn't see whole corn in the manure. We farm 565 acres here

and feed out around 125 plain calves a year and it's always been profitable to follow them with hogs. I'd use hogs even if we fed ground corn, but it doesn't pay to grind corn for calves. They do the grinding well enough. It's different with older cattle. But we use shelled corn, which is as good in a four hundred pounder's stomach as meal. Then we feed corn ensilage and a pound of cottonseed a head a day. If you feed hay in place of corn ensilage, you have to feed more corn to both the cattle and the hogs."

The last few years, McGinnis has wintered his purchased calves lightly, with only breeding hogs following them. For economical gains, no corn is fed the cattle while they are on May and June pasture, though the litters are self-fed on the same pastures. Both shoats and steers are aimed at early September markets, being finished in dry lot on a full feed of shelled corn beginning July 1 when the lush pasture growth has been creamed off. "That way you get a good frame before you add the fat. With additional feed for the hogs, 2 eighty-pounders work out about right to a 700-pound steer," McGinnis says.

"Thin sows in early pregnancy do fine behind steers," this feeder claims. "I hand feed them in the evening, but only when they need it, and the exercise of hunting for kernels in the manure keeps them healthy, though I suppose the vitamins and similar stuff they get out of the manure is a big health factor, too."

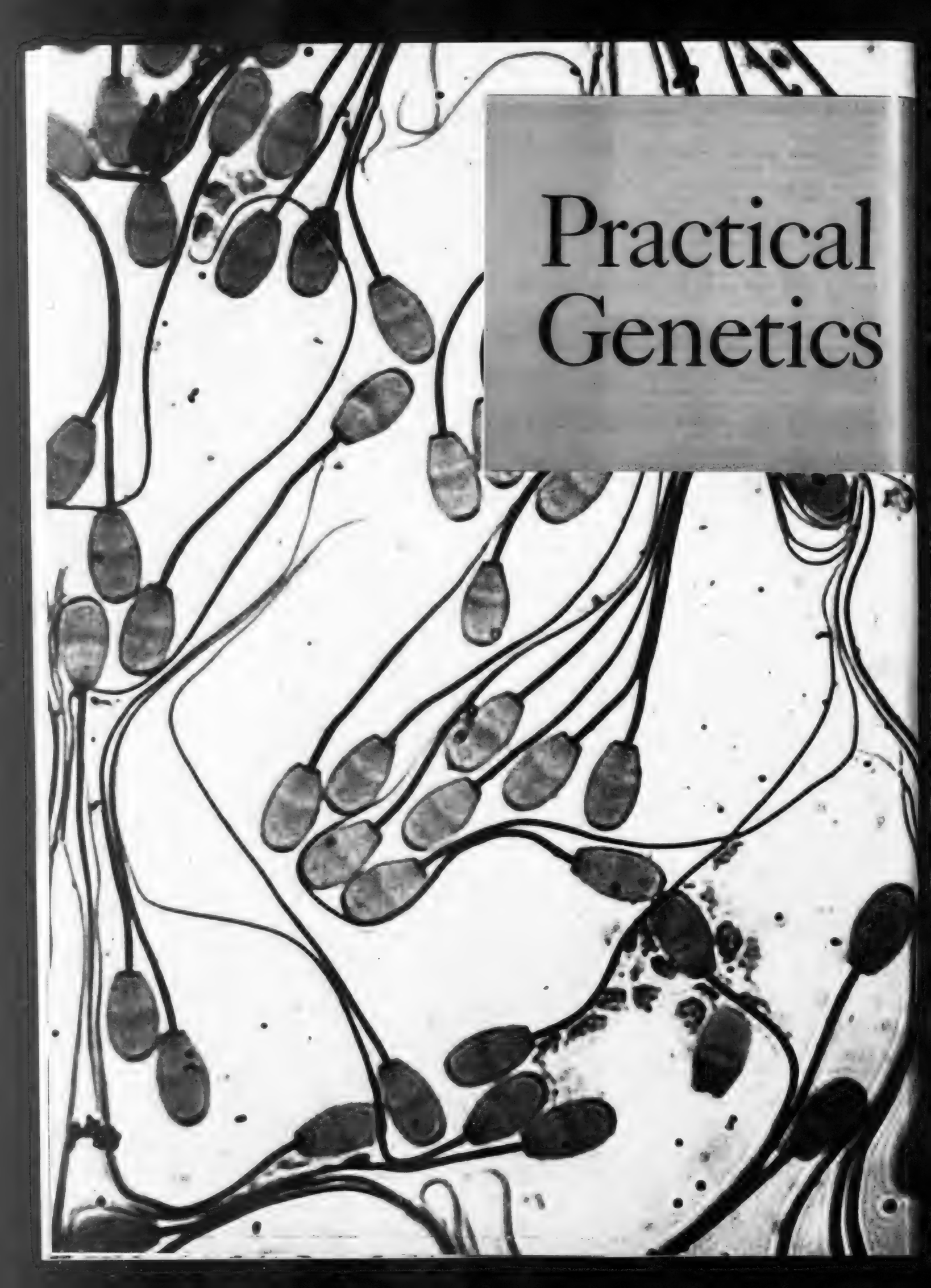
Corn Cob Feeder

Over near Greensburg, Indiana, Jim Lawson raises 85 acres of corn a year on his 240 acres. With about 90 bushel yields, he has some 7500 bushels to turn into beef and pork. No silage is fed the 45 or 50 head of yearlings he buys to feed out annually. In 1700 square feet of barn space, with dirt floor, he runs 100 to 150 hogs with the cattle and has used up to 175 hogs with 35 yearlings. Both have access to an unpaved yard, with the pigs bedding down in a cement-floored driveway of a double corn crib, where they nose down ear corn from the crib itself. For space considerations, he thinks in terms of the sizes of the cattle and hogs when grown, not when bought, but he expects the steers to spend more time in the pasture than the hogs as both mature in the summer.

The stables where the hogs run with the cattle are heavily bedded with straw or crushed cobs, with one section fenced off for the hog's protection. "When a steer, especially one just in from the west, decides to get up and take off, he doesn't pay attention to how many hogs he runs over," Lawson says. "I usually buy choice yearling feeders whenever I can get them,

(*Continued on page* 86)

HOGS get not only undigested food from steer droppings, but vitamins such as B_{12}, which the steer makes in its rumen. Poultry get B_{12} from litter, where their dropping provide a culture for its production.


Practical
Genetics

IF DAIRYMAN Jake Schuster had been using artificial insemination, he'd have been mad, plenty mad. And what's more there probably would have been a dead technician in the county. For Jake had just helped the queen of his herd of registered Holsteins, Schuster's Maggie O'Dare, deliver a red and white calf!

But Jake was using his own registered bull, a proven sire with a pedigree a mile long, and all his neighbors were Holstein breeders, too. So instead of being mad, he was mystified, as thoroughly mystified as the kid that has just seen a magician pull a rabbit out of an empty hat.

When the morning milking was finished, Jake took off for the state experiment station. Gus Stover, the extension dairyman, was surprised to hear the story, but he had heard somewhere about red Angus and red and white Holsteins, so he took Jake to George Mann, the geneticist, and there the mystery was solved. Maggie's calf, it seems, was simply the expression of a recessive factor that had been hanging around for generations trying to assert itself, but had always been beaten down by a dominant partner. Finally, it found another recessive factor like itself to team up with and out came a red and white calf. The scientists assured Jake that his bull and cow were absolutely pure stock, and that it was entirely possible for a red and white calf to be the result of the mating. Just exactly how it happened he still couldn't grasp and he was puzzled by such terms as "dominant" and "recessive." So he decided to turn the heifer over to the experiment station and study a little genetics. Six months and two barrels of midnight oil later he could summarize his knowledge of the subject somewhat as follows:

Genetics is the science of heredity and variation in plants and animals. It's a new science; only got its name about fifty years ago, although men were pondering its questions even before the author of the Book of Leviticus wrote, "Thou shalt not let thy cattle gender with a diverse kind: thou shalt not sow thy field with mingled seed."

The principal reason the science was so late in taking form seems to be that men were so overwhelmed with its complexities that they couldn't sift them out so they could be attacked and solved one at a time.

Finally, Gregor Johann Mendel, a cigar-smoking Augustinian monk of Brünn, Austria, (now Brno, Czechoslovakia) did just that when he read his paper, "Experiments in Plant Hybridization," before the Brünn Society for the Study of Natural Science early in 1865. For almost two years he had worked in the garden of his monastery, carefully crossing varieties of peas and recording his observations in great detail.

Experimenters had tried this before, but they had never attempted to narrow their observations to one particular character of the plant or animal with which they were experimenting. Instead, they concerned themselves with the general aspects of the organism and were thus unable to follow accurately the variations in color, size, shape, and so forth, that occurred in succeeding generations of crosses.

Mendel not only carefully examined all the outward aspects of the crosses but paid special attention to the numerical ratios of the various characters among their offspring.

For example, he set up his experiments with the peas to study the variations of seven contrasting pairs of characters, such as the difference in the form of the ripe seeds—whether round or wrinkled; differences in the color of the seeds; and differences in the length of the stem. He noticed that when he crossed a tall plant with a dwarf the resulting hybrids were all tall like their taller parent. But when he crossed the hybrids with each other the resulting offspring were always in the ratio of three tall to one dwarf.

The same thing occurred when he crossed yellow peas with green peas. The first generation were all yellow, but when these were crossed with each other the second generation came out three yellow to one green.

From these and other observations, Mendel formulated the principles which have become the basis of all modern genetics: 1) that hereditary factors are transmitted as units, not as a blend, as was formerly supposed; and 2) that there is independent chance segregation of the factors in the formation of the male and female germ cells and their chance recombination at fertilization.

How Mendel's Theory Works

All plants and animals are made up of microscopic living cells. These we call body or somatic cells. Each cell has a denser living nucleus with a membrane which contains an even number of worm-like parts called chromosomes. Each chromosome has an identical mate. The number of pairs of chromosomes is constant in every cell in each species of plant and animal and is characteristic of that species, and they carry minute living particles that we refer to as genes. Genes are the units of inheritance. They are always arranged in line on the chromosome like beads on a string, in positions so definite that scientists have been able to "chart" them.

In addition to the body cells there are also germ cells, or gametes, whose job it is to carry on the race and reproduce the individual. They are found in the sex glands of animals and in the pistil and the anthers of plants. In both plants and animals the gametes resemble embryonic body cells, but unlike the latter, they cannot multiply themselves by cell division, nor can they grow. A young body cell breaks into two others just like the original as to nucleus and chromosomes; these two

IDEAL'S BEACON'S NINA, who set a new butterfat record for Guernsey cows. She produced 20,385 pounds of milk and 1,223 pounds of butterfat as a five-year-old. Jacob Tanis of Ideal Guernsey Farms, Augusta, N. J., knew what he was breeding for and got it in this fine Guernsey cow.

SPERMATOZOA (left) of an active ram, magnified 3,000 times. The heads are thought to carry the chromosomes and genes, the units of inheritance. The mid-section and tail are responsible for the movement of the cells which swim like tadpoles in the fluid semen.

again may form two more (total four) and so on. The male body produces many germ cells, which are known as spermatozoa or sperms, and the female body produces fewer germ cells called ova or eggs. Unless a germ cell can fuse with its opposite number it will soon die. The union of an egg and sperm produces a fertilized egg (called a zygote) from which the embryo and then the adult individual develop.

Now, since the number of chromosomes in any species remains constant, it is evident that every time an egg is fertilized by a sperm and the two nuclei unite there cannot be a doubling up of the chromosomes. What happens is that in the formation of gametes (sperms or eggs), the mother cells go through a process called "reduction division." The chromosomes pair with their mates in the nucleus and when the cell splits into two, each new cell gets only half the original number of chromosomes—one from each pair. Then at fertilization, in the nucleus of the embryo, one set of chromosomes from the sperm and one set from the egg combine and the new individual has the same number of pairs of chromosomes as in the body cells of its parents and ancestors. One member of each pair of chromosomes comes from each parent.

Mendel never saw a chromosome or a gene; but to explain the consistent results he obtained in all his experiments he assumed that there was a pair of inheritance factors for each character of the individual —the color of the seed, length of stem, etc. —in each germ cell. He further assumed that partners in the pairs separated and were assorted by chance when the cells divided for gamete formation, and that they were reunited, again by chance, in the fertilized ovum.

The character that showed up in the first generation to the exclusion of the other—the yellow color of the pea seeds, for instance—and then reasserted itself in the second generation in the ration of 3:1, he called the dominant. The other character that was completely obliterated in the first generation he called the recessive. All research since Mendel's time has served to prove the soundness of his theories and we still refer to inherited characteristics as being either dominant or recessive. The principles apply to animals as well as to plants.

Dominants and Recessives

How these dominants and recessives assert themselves can best be shown by an example. The polled factor in cattle is a dominant which is of much economic importance. Here's the way it can be introduced into a herd. The two genes that cause the characters *polled* and *horned* are located on each of one of the 30 pairs of chromosomes of cattle. We'll represent the dominant polled genes by the letters PP. The genes for the horned character we'll identify as pp. Now, let's mate a bull that is pure for the *polled* character with a cow that is pure for the *horned* character. Schematically, the mating can be represented like this:

PP x pp

and the character of the resulting offspring can be read from this grid:

	P	P
p	Pp	Pp
p	Pp	Pp

What this means is that because each sperm carries P and each egg p (although ordinarily only one calf would be the result of this mating) any calf must get a factor for polled from the bull and one for horns from the cow and its genetic makeup in this respect is Pp. P, or the polled character being dominant over p, the horned character, the calf would be polled. But it would not be a "pure" individual, pure breeding for this character like its sire which has the genetic constitution PP. The pure bull is what is called homozygous for polled (PP) and the calf with the genetic makeup Pp is heterozygous. These two words come from Greek sources: homo means like or same, hetero means different or unlike, zygous means yoke or pair. When they are combined, homozygous means a like pair, heterozygous an unlike pair. By simply looking at the individuals, the bull and the calf, we can see that they are both polled: they are both of the same type, as we say, in that neither has horns, and are therefore classified by appearance as phenotypes. But on the basis of their genetic makeup they are of different types which we call genotypes.

Now let's see what the results would be if we were to cross two of the heterozygous individuals, a bull and a cow, each with the genetic arrangement Pp. These produce germ cells, 50 per cent of which carry the polled factor, the other 50 per cent the factor for horns. The mating and its results can again be charted thus:

Pp x Pp

	P	p
P	PP	Pp
p	Pp	pp

Any calf resulting from this mating would have three chances of being polled to one chance of being horned. But it could be one of three different genotypes—either homozygous (or pure) polled, PP, heterozygous polled, Pp, or homozygous horned, pp. This is exactly the result that Mendel had each time he crossed his second generation peas, three individuals exhibiting the dominant character and one the recessive.

It can be seen from this that a mating with a homozygous individual will usually produce the dominant characteristic in the offspring. This also suggests a method by which it can be determined whether a polled bull is really "pure" for the polled character. A bull that is homozygous for the polled character can be mated with any number of horned cows and will never get a horned calf. But the heterozygous individual mated to a string of horned cows will get a horned calf every time two of the recessive genes get together.

This example shows also why culling alone is not enough in eliminating an undesirable character from a herd or flock. Obviously, if a cattleman who was using a polled bull on his herd in an effort to obtain all polled individuals, would also cull all the horned heifers, he would still have some heterozygous heifers left. While the individuals in the herd would eventually all be of the same appearance or phenotype, they would be representative of two different genotypes and there would always be the possibility of a horned individual showing up at any time.

This, in fact, is the explanation of Jake Schuster's red and white Holstein calf. Early in the history of the Holstein breed there were red and white individuals. Some of the early progenitors of the breed were red and white. But the black was dominant to red and as black and white was eventually fixed as the standard color of the breed, the few red and whites that appeared were culled out. Some of these recessive genes for red are still around, however. Jake's bull had one and his cow, Maggie, had another. By chance they got together and the result was the red and white calf. The same kind of genetic background occasionally produces a red Angus.

There are times when neither gene of a pair is dominant to the other. For instance, in the case of Shorthorn cattle, if a red is bred to a white, the calves will all be roans. Roans bred to roans will produce calves in the ratio of one red to two roans to one white.

Lethals and Sports

Besides the multitude of normal inheritance factors passed from generation to generation, the genes also transmit factors that cause serious abnormalities and death in the offspring. These are called lethal factors. Most of them are recessive.

Dwarfism in beef cattle is one of these. When a dwarf calf is born it is an extremely blocky, short-legged individual of excellent type. Its growth is permanently retarded, though, and in a few months at the most, it develops a bloated condition and dies. Fortunately, no homozygous dwarfs ever live to maturity. It would appear, though, that the factor for dwarfism

THE SANTA GERTRUDIS is the result of cross-breeding Brahman and Shorthorn. Dominant and recessive, factors are so arranged that the breed is fixed—a Santa Gertrudis bred to a Santa Gertrudis gets a Santa Gertrudis calf.

is closely associated with the factor for one of the elements that contribute to good beef type and many of our best beef breeding animals seem to be heterozygous for dwarfism. For instance, one of the biggest Hereford breeding establishments in the country frankly admits in a recent sale catalog that one of its top herd sires is a known carrier of the gene. So long as this bull is mated only with cows that do not carry the gene for dwarfism, the lethal factor can never express itself. Every time he is bred to a cow that is heterozygous for dwarfism there is always the *possibility* (one chance in four) that a dwarf will be the result.

There are dozens of other lethal factors such as hairlessness and short spine in cattle; parrot jaw and an amputated condition in sheep; closed colon, stiff legs, cleft palate and leglessness in swine.

Though genes are almost as immutable as the mountains, it happens very infrequently that a gene itself may undergo a change. This is what the geneticist calls a mutation and the resulting plant or animal, different in one or more characters from all others of its kind, is commonly referred to as a sport. Some sports with notably valuable features have become the fountainheads of breeds. In general, however, mutations are a bad thing and bring more trouble than benefit to a breeder. While it is still a matter of conjecture as to what causes mutations under natural conditions, the most plausible explanation seems to be that they are the result of various kinds of irradiation—perhaps cosmic rays. X-rays will bring them about in the laboratory.

Applying the Principles

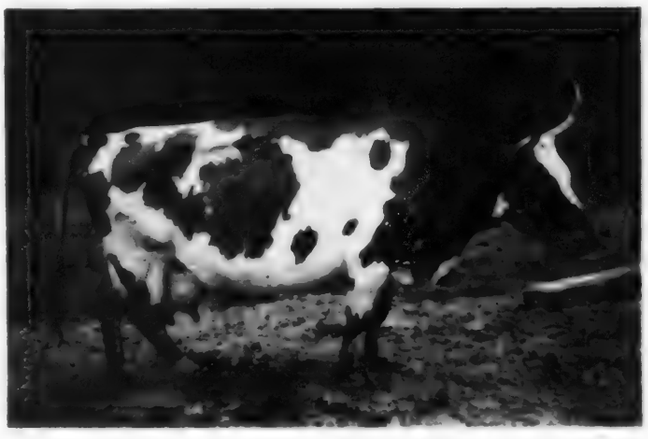
Once a breeder has mastered the fundamentals of genetics he can begin to follow a planned system to raise the quality of his herds and flocks. He will have to be constantly mindful of the fact that breeding, in actual practice, is a much more complex thing than the control of a few clearly defined characters such as were used above to explain the fundamental principles. Most of the qualities he will want to breed into his stock depend upon a whole multitude of characters, some dominant and some recessive, and to get them all into one individual in exactly the right proportions is harder than driving a bunch of wild hogs through a hole in the fence.

For instance, he may want to produce polled cattle; and it will be simple enough for him to fasten onto the polled characteristic and maintain it in his herd. But to breed the necessary fleshing and fattening characteristics into his cattle—characteristics that depend upon their general conformation, appetite, nutritional efficiency, and a number of other factors—is another matter.

Selection is his first step—choosing the animals that display the most desirable characteristics, either by inspection, pro-

(*Continued on page* 122)

A RED AND WHITE Holstein may be produced by normal black and white parents if both carry the recessive factor for red.



SPECIAL MACHINES, such as the multiflora rose planter, above, lend themselves to custom use. They are expensive and a farmer may use one only once or twice in a lifetime. Many are owned by Conservation agencies, who rent them for a nominal sum.

Custom Farming

What is a fair price for custom farming and what is the basis on which costs can be figured?

Figures show that a man should have at least 80 acres of meadow before he shops for his own baler; that it takes 90 acres of wheat to justify your own combine; and that a two-row corn picker is just unnecessary for a farmer without 100 acres of corn. The fellows who drew up these figures, though, don't tell a farmer what to do if he's farming fewer acres. Should he buy the equipment anyhow, or try to hire a custom operator or a neighbor to do the work for him and pray they'll show up? Often the farmer is forced to buy a piece of expensive equipment, such as a baler, simply because that is the only way he can be sure of getting his hay to the barn.

Fortunately, it often happens that he can hire someone in his vicinity to do the work—plowing, baling, combining, or whatever the job may be—on a custom basis. Or, he can buy the machine and help pay for it by doing custom work

himself. In either case, what is a fair price for the work?

The shortage of hired help and the high price of farm equipment seems to set things up just right for a man with the capital and know-how to start a custom farming business. What are the possibilities today for a man to make a living out of the custom business and on what basis can both the operator and the farmer agree on fair rates?

The Custom Man

The potential custom man is often one of those born tractor jockeys who wants to be free from the responsibilities that go with the ownership of land and livestock. To such a character the experience of John McKinstry offers a lot of encouragement.

McKinstry is the kind of fellow who doesn't mind admitting that to him tractor driving is a man's sport. "There's nothing I'd rather do," he says, "than drive down the field on a beautiful day with that engine talking to me up front and good dirt turning up behind." Only trouble is, the custom business has been so good for John he can't afford to just sit there and drive any more. He hires two men to run the tractors while he plans the work and makes repairs.

A native of Iowa, McKinstry now operates in the heart of the Bluegrass country, maintaining his headquarters on the Big Sink Pike, just a couple of jumps out of Versailles, Kentucky. He farmed in Iowa in the depression and drought-ridden 'thirties; studied in various parts of the country, winding up with a law degree from the University of Kentucky; found that he liked the central Kentucky country and its people, particularly the girl who became Mrs. McKinstry. After a spell at the bar, the siren call of the tractor proved irresistible and McKinstry went into custom farming. Five years later he finds himself well satisfied with the move.

There's a special situation in that central Kentucky region that keeps McKinstry's equipment and services much in demand. Land down there sells at some of the most fantastic prices ever heard outside of Manhattan Island. Six hundred dollars an acre is pretty common; $700 and $800 isn't considered out of line at all for land that grows 60 cent tobacco and $50,000 horses. But despite these prices, that ground still needs plenty of work and that's where McKinstry comes in.

"I specialize in ground preparation," is the way he puts it, "and my prime tools are a Graham-Hoeme plow and a Tilla-Plow. These soils down here need deep cultivation. They are naturally dense. On top of that, years of working with the moldboard plow has built up an impervious hardpan about six inches below the surface and then they are subjected to compaction by livestock. This compaction is not counteracted by the loosening effect of days of freezing because of Kentucky's mild winters. Enough landowners around here have come to realize the seriousness of this condition that I can keep my Minneapolis Moline U busy with that heavy equipment from the first good days in January until the very end of November."

"Rates? I charge $7.00 an hour for this work with my MM-U. On a per acre basis that will run anywhere from $4.00 to $17.00," McKinstry answers when the matter of price is brought up. "I base all my rates for baling, threshing, drilling, or whatever the job may be, on an old experience table published by the University of Kentucky some year ago which I've brought into line with current prices by common sense figuring and by checking them against the competition. Another check is the allowance of one cent per foot the government provides for building a certain type of terrace. This terrace, when built with a Farmall M or MD with a three-disc plow, is a two-furrow course, and at the above rate would be the same on the average as six dollars per hour. Comparing this to plowing in central Kentucky with a moldboard plow with the same tractor, our rate of five dollars per acre also works out at six dollars per hour.

"Usually, my acre rates cover operations in fields of ten to twenty acres or more of average, gently rolling, clear fields and my hourly rates apply to any operation presenting unusual operating conditions such as small fields, very rolling land, rocky land, bulldozed land, etc.; because the more severe the operating conditions the more tractor hours it takes. I never shy away from hard jobs but change my rates from acres to hours and inform the parties of my estimate of ultimate cost.

JOHN McKINSTRY, central Kentucky custom operator, specializes in ground preparation. He likes machinery and has a knack for keeping it rolling. "Give it grease every day, if you want to avoid breakdowns," he says.

"I figure that my use of the big MM tractor with the heavy equipment behind justifies the $7.00 an hour rate. You have to figure the size and speed of the tractor and the size of the equipment, too.

The Hour Meter

"And while we're on the subject of tools and rates," McKinstry continues, "I'll tell you what's one of the most essential pieces of equipment for any custom operator—an hour meter. I have an old MM-Z tractor besides my big U with the dual rear wheels and I have a meter on both of them. Those meters provide an accurate check on the performance of the tractors and guarantee a square deal to all concerned in any particular custom operation, my clients, my employees, and myself. It would be pretty difficult to tamper with those meters and the only way a boy could cheat on them would be to rev up the engine and let it run wide open while he went to sleep in the shade. It wouldn't take long for news of such a performance to get around this territory."

Whereas most farmers who do custom work operate farms of their own and do the custom work as a sideline, McKinstry makes custom work his main occupation. While he does rent some crop land—this year he had a total of 285 acres in wheat, oats, and corn—his crops he says are "simply insurance to guarantee machine time. If I were sure I could keep my equipment busy without crops of my own, I wouldn't put anything out. I think it won't be too long until I reach that point."

McKinstry guarantees his clients that their crops will have the same priority as his own at harvest time and says he wouldn't hesitate to rent additional equipment if need be to save both his crop and that of a customer.

Another specialty of McKinstry's was threshing. He is located in the center of Kentucky's multimillion dollar light horse industry which produces a constant demand for straw of the highest quality. To capitalize on this demand for a quality product he designed a special conveyor for his threshing machine that picks up the straw directly from the thresher while it is still free from chaff, weed seeds, and other foreign matter, and shunts it right

N. R. HAMM, of Perry Kansas, stops for a refrigerated drink. The water tank is in the machine truck which is equipped to repair the fourteen combines he works from Texas north to Canada, with the wheat season.

into the baler. He charged 45 cents a bushel for threshing, furnishing all labor and wagons to haul the shocks to the thresher, and got $7.00 a ton for the baling operation. His patrons collected a premium of $5.00 a ton for the straw on sales to the horse farms.

That 45 cents a bushel looks like a mighty high figure for threshing—and it is. A grain farmer could never stand such an expense. But McKinstry's customers are not grain farmers. Stock and tobacco are their specialties. Small grain is sown on the tobacco fields in the fall to provide a cover crop, which is of primary importance, and early spring pasture. The straw crop and the grain are looked upon as by-products. Other factors that contributed to the high rate were the excessive moving time caused by the relatively few acres of small grain on the farms and the very unfavorable weather at harvest time. All of which shows how closely custom rates are keyed to local conditions.

For baling straw with a pickup baler McKinstry charges $6.00 per ton. For hay baling his rate is $5.00 per ton. Kentucky weather being what it is, though, he shies away from baling hay.

The labor situation having forced him 'out of the threshing business, he now has a new uniharvester, a combination tractor-combine-cornpicker, that has relegated his threshing machine to a used equipment lot.

For seeding with a grain drill, McKinstry charges $2.50 per acre and hauls the seed to the field. He charges $2.00 per acre for cultipacking after the seeding but is willing to admit that his rate is a bit too high for large fields.

He pays his labor 60 cents an hour if he has to furnish them with transportation, 75 cents to 80 cents if the man furnishes his own transportation.

Repairs

Custom work demands a master mechanic and McKinstry fills that role perfectly. Rebuilding an engine is his idea of perfect bliss. He has a work shop that would be the envy of any serviceman and a utility truck with tool boxes built in the sides that enables him to make on-the-spot repairs wherever needed.

"Any time we have a breakdown" he says, "we fix it up right then and there. A tobacco barn makes a mighty handy place to weld a frame or grind valves."

He estimates that repairs cost him about seven per cent a year on all equipment other than tractors. On his tractors the bill will run about two per cent except for complete overhauls.

"Mufflers and drawbars are our biggest items of expense on the tractors. We're always knocking off mufflers on limbs and breaking our drawbars with this heavy equipment. We'll use about two mufflers and two drawbars a year on each tractor. On top of that valves will cost about $25 for each tractor, spark plugs $3 and new hydraulic hose $15. When I put new hose on, though, I put on good hose that is made to last a while, not the kind of stuff that comes with the original equipment."

McKinstry runs his tractors about 2000 hours per year and figures the engines need rebuilding about every 4000 to 5000 hours. A major job like that costs somewhere between $200 and $300.

During slack seasons this naturalized Kentuckian keeps himself busy with pipe fitting and electrical jobs and tries his hand with a law case every once in a while. "I usually win them, too," he admits.

As to his future in custom work in central Kentucky, McKinstry has no doubts. "I take on no more work than I can handle," he says. "I don't advertise. Don't have to. I get all the advertising I need by word of mouth, and that's the best kind. With clients like the First National Bank in Lexington and individuals whose holdings run into thousands of acres, I expect I'll be busy for a while."

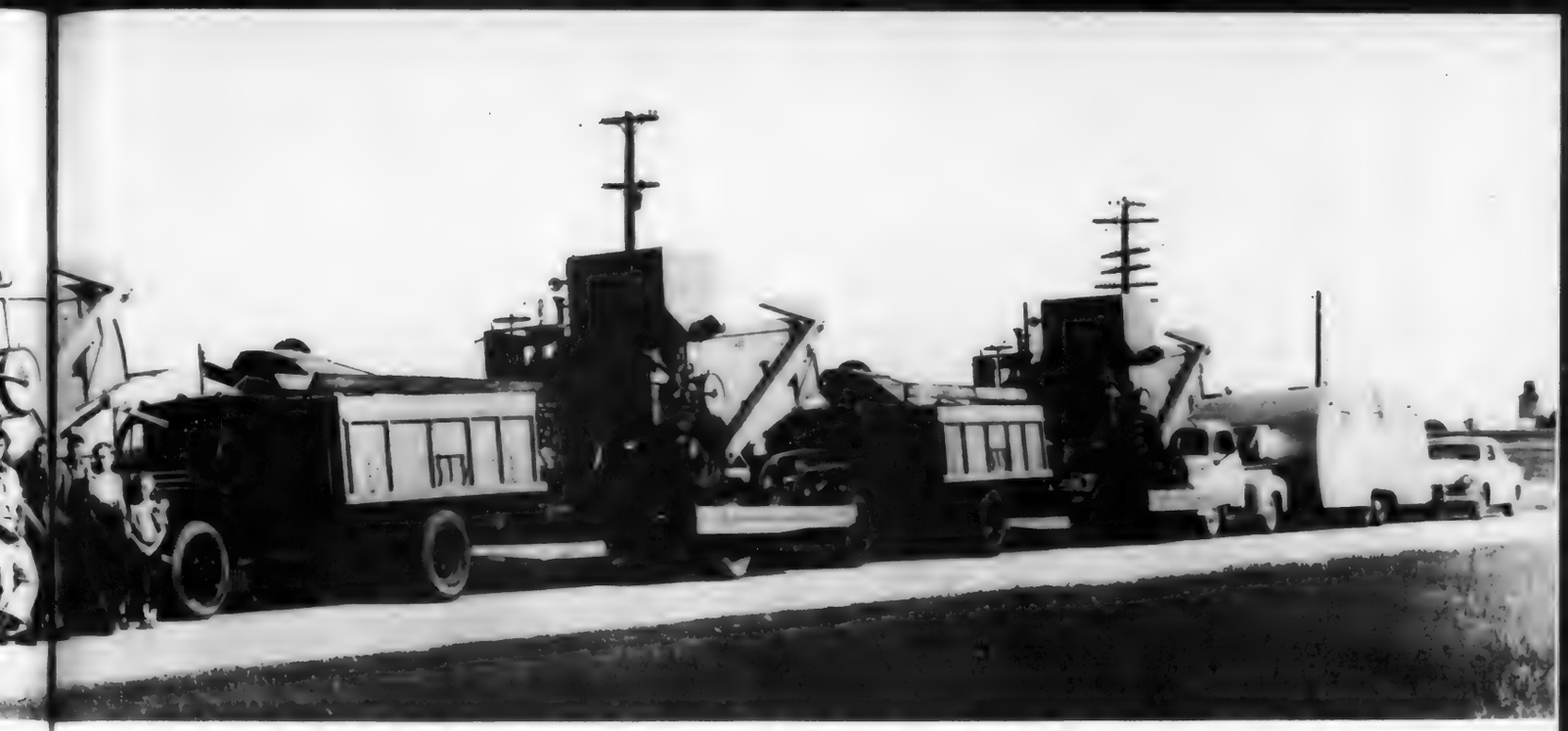
John McKinstry is a man who has discovered the opportunities existing in a special set of circumstances and has the abilities needed to make the most of them.

Around his place, land preparation is his 'round-the-calendar bread and butter provider. In other sections it might be custom lime spreading, application of anhydrous ammonia with pressure equipment, orchard spraying, crop dusting and spraying by airplane, or possibly even post hole digging and fence building. The combine operator who follows the wheat harvest from the Gulf of Mexico to the upper reaches of Canada every year is an old story. The point is that the custom operator who expects to stay in the business had better have the kind of equipment that his customers won't be tempted to buy themselves and equipment that is well adapted to the agricultural peculiarities of his region.

Combine Caravan

Speaking of combine operators, N. R. Hamm, Perry, Kansas, can tell what it takes to make a go of that business. He does a little farming for himself—has 100 acres of corn and a couple hundred acres of wheat—but from May until September he follows the wheat harvest from Texas to Montana with a caravan of fourteen Massey-Harris self-propelled combines. Ten of them are his own, the other four are owned by his widowed sister.

Despite their constant travels, he and his crew never get far from Hammtown. This is the mobile village of sleeping trailers, kitchen and dining trailers that is home for the men five months a year. Another indispensable part of the caravan



A CUSTOM OPERATOR ON THE ROAD must become a legal as well as a logistics expert. Every city, county, and state has a different set of rules as to height, width, weight, length, and lighting. Custom combine caravans such as this follow the wheat harvest from Texas to Canada.

is the fully equipped machine truck with welding equipment, drills, work bench, etc., for keeping the machines in repair. This truck also has a refrigerator and water tanks so that the men have cool water available at all times.

Hamm's biggest problem is getting good labor. He uses high school boys to run the combines. "Older men who are competent just won't take a summer job," he says. "Those that will are either drinkers or are married and married men never stick with us very long. I don't blame them: I wouldn't spend four months on the road, either, if I didn't have my wife with me."

THE HOUR METER on a tractor is a protection for the operator, his employees, and his clients. It helps determine prices and is a check for the farmer.

Rates for Hamm's combining vary with the locality and size of the operation. "We adjust our prices to the local competition," he explains. "Early in the season this year we took on a big job in Texas, a 15,000 acre operation where we didn't have to pull stakes for weeks and could keep our combines in action during every minute of daylight. We did that for $2.50 an acre, but that's just absolutely rock bottom."

During off seasons Hamm runs a quarry and rock crusher and provides a wide assortment of custom services for farmers—building ponds, plowing, planting corn, baling hay, and picking corn.

What Are Fair Prices?

Approaching the picture now from the customer's angle rather than the operator's, the question becomes primarily a matter of establishing equitable prices. To say that custom rates vary all over the country is a masterpiece of understatement. In those areas where custom workers are few and the demand for their services high, the rates tend to be as much as the traffic will bear. In other places, especially in those areas where there are a preponderance of small farmers who do part time custom work, rates are cutthroat and too low.

The following conversation between Lew Boggs and Fred Adkins, a couple of Vermilion County, Illinois farmers, is a

(*Continued on page* 104)

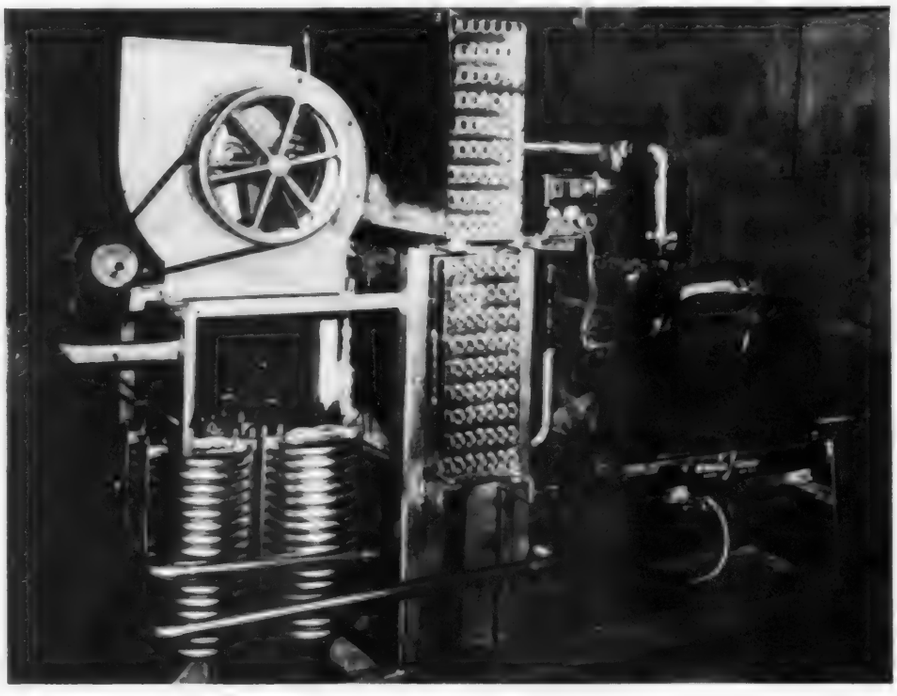
Heat Pumps

Your house can be like the seashore the year around. By using the heat that is available in a well, in the air, or in the ground, a house can be heated in the winter. The same machine will cool it in the summer.

THERE are homes being heated today without burning a single lump of anthracite, a drop of oil, a cubic foot of gas, or an armload of kindling. The machine which does the job is a "heat pump," a sort of first cousin to the refrigerator. Operated by electricity, but using no fuel, it warms in winter by pumping into the house heat which is stored in the earth, air, or water. When its cycle is reversed, the machine cools by pumping the heat from the house and depositing it back in the earth, water, or air. Because on most farms there are wells, springs, or ponds which make ideal heat sources, the machine seems to be ready-made for farm home use in much of the country.

The idea of extracting heat from water, the air, or earth in winter is not new. A century ago, a group of scholarly gentlemen of the Glasgow Philosophical Society heard Lord Kelvin, the noted British physicist, propose to do just that. The "air heat pump" machine which he thought would do the job was never built, but in 1870 his principle was used to assemble, in reverse form, a machine for space cooling which was known as the Bell-Coleman Cold Air Machine. So Lord Kelvin's process became popularly understood as a cooling process, although he had originally considered it for heating.

The first actual application of the heat pump appeared in Europe just before World War I, where it was used for industrial process work. In the United States research in heat pumps developed rapidly between 1930 and 1940, when a number of residential and industrial installations were made. The greatest strides have been taken, though, since World War II. In March, 1953, there were over 1500 heat pumps in the country—about half of them in private homes.



THIS IS the heat pump machine that Dick Logan of Morrow County, Ohio, assembled. It has machinery similar to that shown in the diagram on the opposite page, and it both heats and cools his home.

How the Heat Pump Works

A review of three basic natural laws explained in our high school physics might help us to understand how a machine can take heat out of the air, water, or earth and use it to heat a home. (1) Unless the temperature is at absolute zero, which is minus 460° F., there is heat in all things. (2) This heat tends to flow from a warmer substance to a cooler substance. (3) Gas becomes warm when it is compressed because the heat units in it are then concentrated in a smaller space; gas cools when it expands because the heat units are then spread over a larger area.

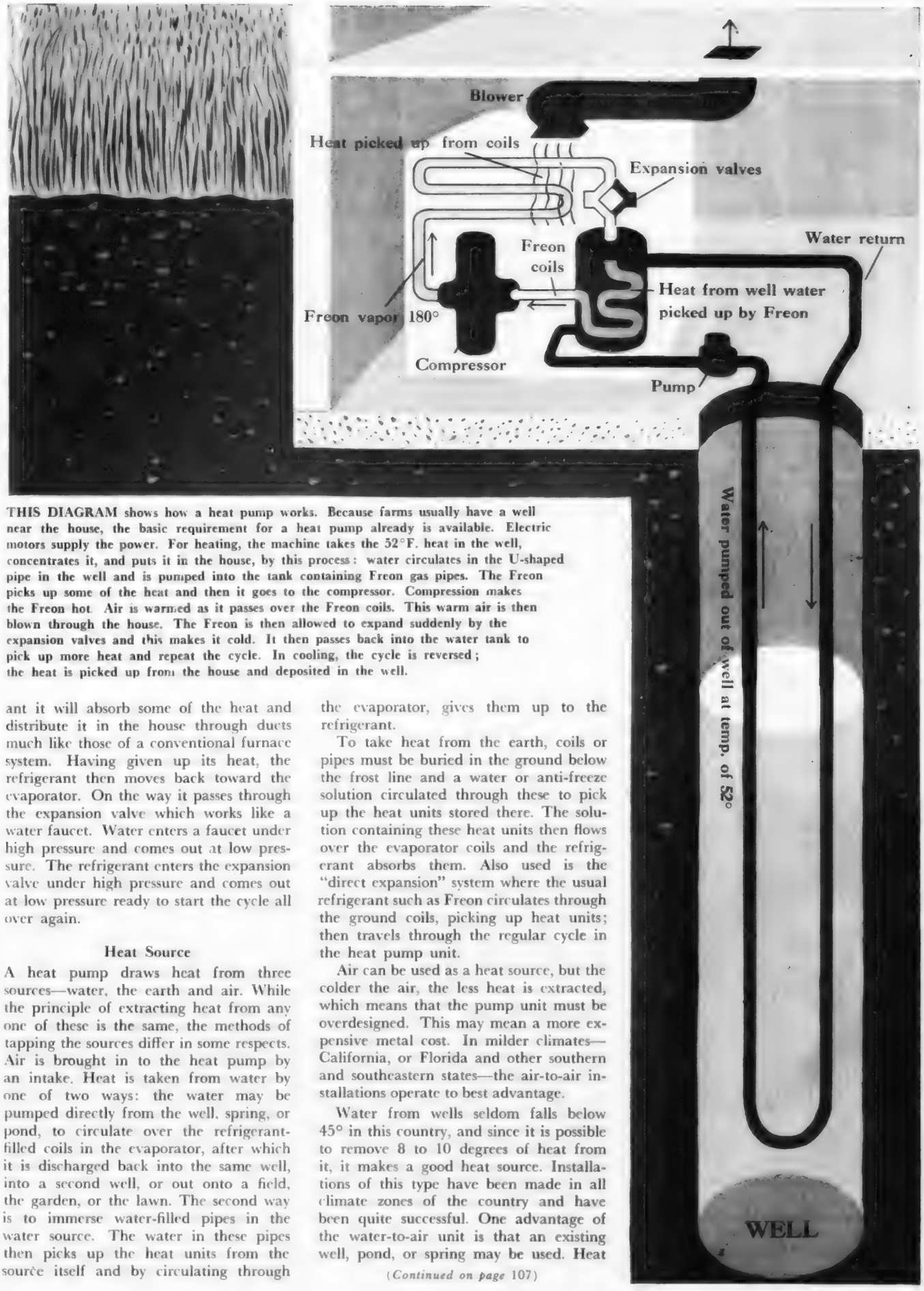
One engineer says that the process by which the heat pump machine takes advantage of these laws is like the way water is lifted with a sponge. To lift water with a sponge you must first submerge the sponge in the water and let the surrounding water flow in. The sponge is then lifted with its load of water, squeezed, and the water flows out.

In the heat pump machine, a gas acts as the sponge, not to absorb the water, but to absorb the heat which is in the water. Many gases will do the job, but some gases like ammonia or Freon make better heat sponges than others. These gases are called refrigerants. A refrigerant, like other gases, warms up when it is squeezed or compressed, and cools when it expands.

The heat pump uses this quality by circulating a refrigerant around and around through a circuit of coils and pipes. At one side of the circuit the coils pass through a structure called an evaporator. Here the cold expanded refrigerant in the coils absorbs a few degrees of heat from the water, earth, or air around it.

As the refrigerant carries its load of heat toward the other side of the circuit, it passes through a compressor where it is squeezed. This causes the gas to become hot by concentrating the heat units it contains. As it goes through the compressor, the refrigerant also absorbs more heat from the electrical energy expended to run the motor of the compressor.

The refrigerant, which is now hot, moves through another set of coils called a condenser over which a fan circulates air from the house. Because the house air is relatively cooler than the refriger-



THIS DIAGRAM shows how a heat pump works. Because farms usually have a well near the house, the basic requirement for a heat pump already is available. Electric motors supply the power. For heating, the machine takes the 52° F. heat in the well, concentrates it, and puts it in the house, by this process: water circulates in the U-shaped pipe in the well and is pumped into the tank containing Freon gas pipes. The Freon picks up some of the heat and then it goes to the compressor. Compression makes the Freon hot. Air is warmed as it passes over the Freon coils. This warm air is then blown through the house. The Freon is then allowed to expand suddenly by the expansion valves and this makes it cold. It then passes back into the water tank to pick up more heat and repeat the cycle. In cooling, the cycle is reversed; the heat is picked up from the house and deposited in the well.

ant it will absorb some of the heat and distribute it in the house through ducts much like those of a conventional furnace system. Having given up its heat, the refrigerant then moves back toward the evaporator. On the way it passes through the expansion valve which works like a water faucet. Water enters a faucet under high pressure and comes out at low pressure. The refrigerant enters the expansion valve under high pressure and comes out at low pressure ready to start the cycle all over again.

Heat Source

A heat pump draws heat from three sources—water, the earth and air. While the principle of extracting heat from any one of these is the same, the methods of tapping the sources differ in some respects. Air is brought in to the heat pump by an intake. Heat is taken from water by one of two ways: the water may be pumped directly from the well, spring, or pond, to circulate over the refrigerant-filled coils in the evaporator, after which it is discharged back into the same well, into a second well, or out onto a field, the garden, or the lawn. The second way is to immerse water-filled pipes in the water source. The water in these pipes then picks up the heat units from the source itself and by circulating through the evaporator, gives them up to the refrigerant.

To take heat from the earth, coils or pipes must be buried in the ground below the frost line and a water or anti-freeze solution circulated through these to pick up the heat units stored there. The solution containing these heat units then flows over the evaporator coils and the refrigerant absorbs them. Also used is the "direct expansion" system where the usual refrigerant such as Freon circulates through the ground coils, picking up heat units; then travels through the regular cycle in the heat pump unit.

Air can be used as a heat source, but the colder the air, the less heat is extracted, which means that the pump unit must be overdesigned. This may mean a more expensive metal cost. In milder climates—California, or Florida and other southern and southeastern states—the air-to-air installations operate to best advantage.

Water from wells seldom falls below 45° in this country, and since it is possible to remove 8 to 10 degrees of heat from it, it makes a good heat source. Installations of this type have been made in all climate zones of the country and have been quite successful. One advantage of the water-to-air unit is that an existing well, pond, or spring may be used. Heat

(*Continued on page* 107)

By Agnes Pendergast Kane

The Aaggie Cow

Aaggie was a 4-H project; she grew up to be the prima donna of the herd and the darling of her owner

THE story of the Aaggie cow began long ago when I started taking care of the young calves. I had just graduated from stripping milk into the calf pan to a full-time job of milking the old jersey. Our herd was made up of just cows in those early days, but like so many farmers then, we had a hankering for cows with papers.

When all but two of our cows were found to be reactors in the statewide TB testing program in 1934, we began our search for a new herd. Ray Bower of Skaneateles wanted to sell 13 purebred Holsteins. After looking them over, Dad bought them, added some grade cows to help fill the stanchions, and we started over again.

The following March, our first purebred calf was born—a large nicely marked heifer. We called her "Young Aaggie" after her mother, Aaggie Ormsby Perfection Segis.

Though I had been in 4-H the year before with a garden project, I hadn't given serious thought to having a dairy project until the county agent came around one summer day and spotted the Aaggie calf prancing around the pasture. He was quite excited about her and persuaded me to break her to lead and show her at the 4-H County Round-up in August.

Aaggie was my partner for half a lifetime, the main reason for wanting better pasture and herd management. Whatever I learned, I took home and applied to her and the rest of the herd.

So, a showring career began for Aaggie and me. The morning of the fair, Aaggie was scrubbed and shining, trailing an old bed blanket, which had to pass as a show blanket. Our hopes collapsed when the neighbor who was going to truck us to the fair called up to say he had to draw wheat that day. Dad, bless his heart, knew how much work had gone into preparing for the show, so he backed out the old Pontiac, took out the back seat and told us to climb in.

We got to the fair grounds just as the calf class was called, so we scrambled out and made a dash for the showring. We soon found that there was an art to showing a calf, and were surprised when Ag won the blue ribbon in her class, and reserve champion honors of the Holstein show. That meant she was entitled to show at the New York State Fair in September.

State Fair was big and noisy and lonesome. When the family wasn't there, I stuck close to Aaggie, eating ice cream for breakfast, dinner and supper. She won second in the junior calf class, but if an experienced showman had had her, I know she would have taken first. I was too green to show her to best advantage, but we went home, wiser than before.

The fair bug bit us that first year and by the 1936 show season we were off again. My sister Virginia and I brought five head to the big white cattle barn at the Cortland County Fair and after getting them settled, finally found a room for ourselves in downtown Cortland. Never shall I forget our long hike down the main street of Cortland about 9 o'clock that first night, me in my old overalls and sneakers, carrying a battered suitcase, and Ginnie worrying because I wasn't more dressed up.

Aaggie was a truly lovely junior yearling and had had the best care that I could give her. She was first in her class at the 4-H Round-up and champion of the open class. We also won first in showmanship, an award I was very proud of, for it was still a tussle getting Ag from the barn to the showring. Once inside, though, she would usually straighten out and practically show herself.

Then on to State Fair where Aaggie won the blue ribbon in the junior yearling class and third in the stiff competition of the open class. Unaware of what and with whom I was competing, I continued to lead Ag around-and-round at the judge's direction. When he singled out three of us, I still did not realize that Cornell Ormsby Esteem and her half sister, Empress, were competing with Ag for the blue ribbon. The blue went to Esteem who later was made All American junior yearling, but it was a proud third place heifer and owner who went back to the barns.

Several people tried to buy Ag that year and were surprised when I wouldn't even set a price on her. There just wasn't enough money to take Ag from me.

I was actually disappointed when the notice came that summer that my application had been accepted at Cornell. But my plans included four years of college so I could get a job and fix up Pender Valley, put in water cups, box stalls and a hundred other things.

At Cornell the dairy barns had the greatest appeal for me and when there was a spare minute, I would go there, where I could feel more at home. The second half of my freshman year I got an NYA job doing general work around the barns—a funny job for a home economics student! Probably I learned more that has been of value to me just by being there—milking once in a while, helping feed the calves, brushing the cows—than from all the rest of the courses put together. Dad had told me, "Learn all you can, and can all you learn." I tried to do just that, taking many of the things that I read or heard about to try out at home.

We had walked Aaggie to the neighbor's on Christmas Day to breed her to a grandson of North Star Joe Homestead, so that summer she would be showing as a bred two-year-old, due around September 25. She was a big girl now, a bit awkward and a little high on the tailhead.

Cortland seemed far different that year. We knew many of the exhibitors and really felt like old hands at the showing business and quite at home. When it came time to decide where we would sleep this time, I announced that I was going to stay with the cattle—no more long hikes to town for me!

September 27, the day I was supposed

to be back at college, Aaggie had her first calf—a lovely heifer that was quickly named "Princess." She later placed first in the 4-H senior yearling class at State Fair and was named champion Holstein female bred by exhibitor. A year or two later she died from an infection caused by hardware.

We had started testing in DHIA, so Aaggie took her place with the rest of the herd. Her production wasn't anything to get excited about, but it was consistent. We didn't know too much about proper feeding and management in those days, and having heard a lot about burning a cow out by feeding her too much, we probably did not feed her as much as when she was a yearling.

In 1938 Aaggie showed as a dry three-year-old, winning her yearly honors as champion at the 4-H county show. That was the year we were in the large tent west of the barn when a terrific storm hit the area. The rain poured through the canvas as though it were cheesecloth. The wind caught at the tent flaps, whipping them up and down, and the center poles started weaving and we all rushed to steady them. Most of the cattle had on their show blankets, but by the time the storm let up, both cattle and owners looked like a bunch of wet chickens. By the time the cattle were bedded down once more and cleaned up, morning was crawling up into the eastern sky. That was one show day when everyone looked a little bedraggled.

That year, too, Aaggie represented New York State 4-H at the National Dairy Show. She placed in the blue ribbon division of the show and won second in the entire type and production class.

The long trips, plus the fact that she hadn't gone dry before freshening, cost her her bull calf, though. At the time I thought perhaps it was because of line breeding; she had been bred to her paternal brother, and according to some articles I had read, to do that was to head for ruin. So, being young and stubborn, I kept putting off breeding her in the hope that somehow we could get her bred to something really outstanding. If only the many opportunities of breeding artificially to great sires had been available then. Finally I had to breed her again to our bull.

Late that fall, Aaggie freshened with a nice bull calf, duly named Prince, for I had an eye to the future, too much hope in my heart, and could already visualize a prize-winning produce of dam from my Aaggie cow. Aaggie was really putting her neck in the collar this year. I had persuaded Dad to milk her three times a day so that the strain wouldn't be too great on her udder and she was doing much better than we had any idea that she could —23,000 pounds of milk and 1076 pounds of fat.

I had never let Ag out to run with the other cows since she was brought in to be trained to show as a calf, but 1940 was terribly dry and our hay crop was very short. I couldn't afford to feed her in the barn, so turned her out with the herd. She really didn't know how to behave herself and would go dancing up to the other cows as though she were still a yearling. This got her into plenty of trouble.

We showed at Cortland and State that year, my last year in 4-H, though we had

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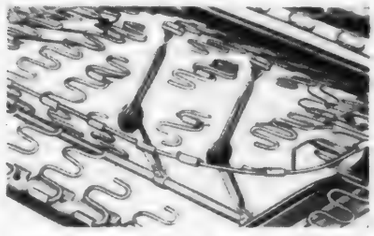

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nothing sensational. Aaggie had been milking very heavily and was thin and tired looking, but by then I had the idea that I couldn't go to the fairs without her. At State we had stalls on the middle aisle and, for once, enough money for straw aplenty for bedding. Aaggie was second in the Aged Cow class in 4-H, ending her showring career with the same placing that she started out with, but showing to such a disadvantage in the open class she did not place. I was grateful to the judge for keeping her in the lineup, and not sending her back to the barn with so many of the other hopefuls.

In January, Aaggie dropped a big heifer calf, sired artificially by Hurlwood Sir Veeman Hengervelt. It was a long and very difficult calving. When it came time to have her bred again, we tried twice without success to breed her artificially; then fearing that something might be wrong, we had her examined. Dr. McAullif said that she had been injured while calving and that the injury had walled off and formed a large growth. He was afraid that she would never get with calf again.

My first thought was "I'll have to sell her for beef—my Ag who had earned her place in the herd for life." Then I decided that I couldn't possibly sell her: I'd take her up on the hill and shoot her first!

After the first shock of Aaggie's trouble wore off, we began to ask questions. Wasn't there anything that could be done? Dr. McAullif knew how much we loved the Aaggie cow, so he said he would try everything he could to break the growth. We agreed that it would be better to have her die as a result of experimenting than to sell her for beef. Instruments didn't do the job, so Dr. McAullif tried shots. It was a long time ago now, but I do remember that these made Aaggie very sick at times—off feed, bloating, scouring. But at last came the day when he found that the growth was gone. Two years and two months from the time she had had "Lucky Girl," she dropped "Miracle," a heifer.

Aaggie, now 11, was a little slower on her feet, but still liked to go up to the pasture hill with the rest of the herd. I didn't see much of her for the next few years, except on brief visits home, but Ginnie wrote often about her and I knew that Aaggie's next calf by Audric Carnation Posch was a big strapping bull named Aaggie Boy; that the next year at Christmas time she startled everyone by having twins; and the spring that she was 14, she wasn't eating much and they didn't think she would last much longer. This news was not surprising, but we headed for Pender Valley to see if something couldn't be done for her.

She stood in her old stall—thin and ragged looking, her left hind foot so swollen than she could hardly stand on it. We started thinking then about bringing her to Pender Kane Acres, as my husband, Tommy, and I called our farm, where she could have the comfort of a box stall.

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I was sure she would not survive another winter at Pender Valley. When we went to get her, she loaded as calmly as ever, though it took a lot of hanging on to keep her feet under her. In years gone by Ag and I had ridden a good many miles together and I don't think she had forgotten any more than I had.

Aaggie was homesick the next day and bawled when the cows were outdoors, but she knew my voice and seemed to enjoy her beet pulp and hay and especially her brushing off. Her hide was dull and dusty and I despaired of ever seeing it sleek and shining again.

As soon as I could, I started to work on her feet. Tommy got me some flaxseed and I put hot applications on her swollen hind feet. It sounds easy now as I write it, but doctoring Ag was never an easy job. By keeping at it, though, I soaked some of the soreness out of them, and got some of the corns and callouses trimmed.

We did not hold much hope that she was bred, but we had the vet check her one day when he was at the farm. Lo and behold, she was with calf! Suddenly it became very important that she live until August! But everything seemed to work against it. One morning, I discovered her with her head caught in a scrub apple tree, carefully trying to ease out. I saw that I couldn't do anything to help so I ran for the saw and Tommy. While I steadied and soothed her, Tommy sawed the tree off just above her head. Then we eased her up the bank.

Another day, we took time off to go home, hoping she'd keep out of mischief until we got back. When we arrived at dusk, there was Ag down in the swamp amid the cattails. It was a struggle to get her up on her feet, and even more of a struggle to get her out of the rough swampy ground and onto sound earth once more. She seemed to know she shouldn't be there, and limped and hopped along without protest.

Finally August came and with it the suspense of Aaggie's approaching calving. She stayed outdoors night and day and when the heat of the sun began to be felt around 10:30 a.m., she would start for the shade of her old apple tree. I could see her from the front porch and, if I had a spare minute, I'd go and sit with her.

Aaggie began to spring quite fast and the last few nights I checked on her every two hours, walking down to where I had found her last. She was never surprised or startled to see the flashlight come bobbing along toward her.

On August 13 she began to act a little uneasy. She lay down near her favorite tree and even at her dinner without getting up. After awhile she began to do some elaborate bed-making. She'd arrange the straw on both sides of her as far as she could reach, pushing and packing it as she wanted it, then she lay down. Her eyes looked dull and listless, but she held her old head up and actually seemed to enjoy

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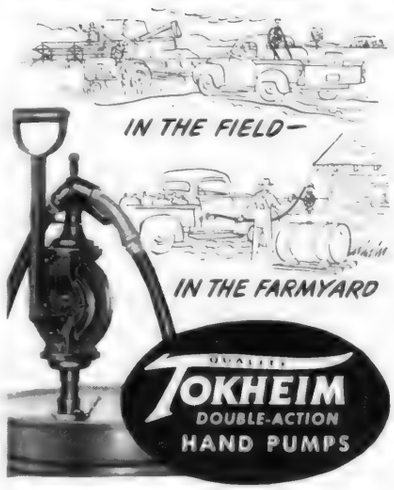

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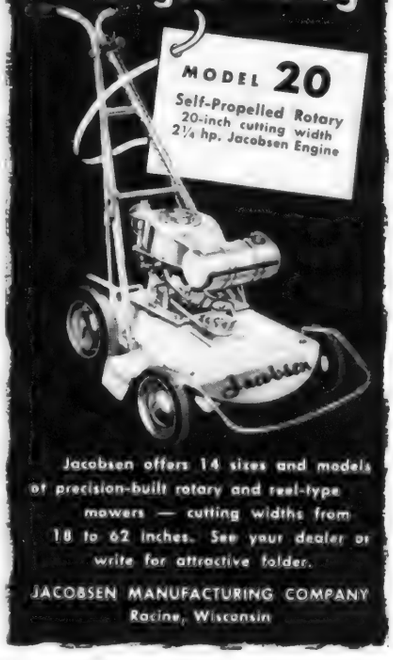

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the pains that brought her calf along. She kept looking back at me inquiringly as if to say, "Anything yet?" About 11 p. m. a shiny little heifer arrived. I didn't know if Ag would be able to get up, but before I had time to move the calf in front of her, the old cow was up licking the both of us in a business-like way. I gave her some warm beet pulp and warm water then and it wasn't long before she had the royal youngster on her feet and nursing.

I stayed with them all night for I was afraid Ag might accidentally fall on the calf. As things turned out, there wasn't much danger, but I thought both the calf and I would have our hides licked off, for that old cow just couldn't leave her baby alone. She was up and down all night, licking the calf until it got tired of it and moved to another corner; then she'd start in on me.

Perhaps this "child of her old age" was good for Ag. She used her lame leg more and did not seem to limp so much. Although she was getting thin from milking about 50 pounds a day, she seemed fine.

Spunkie was soon too rough to leave with Ag, but once in a while I let them out together. I'm afraid that was a mistake because she banged into Ag's udder. It swelled very badly and brought on the first real case of mastitis Ag ever had. The veterinarian gave her a shot of penicillin and injected the quarters, but still it hit Ag hard and she was plenty sick—wouldn't eat, scoured, and looked terrible! After two days, though, her udder responded to treatment and the swelling went down. She soon came back up to 25-30 pounds milk per day and stuck right to it on a limited grain ration.

In March Ag was 16 years old. We discussed the possibility of her having another calf. I didn't think that she could possibly carry another one, but Tommy thought we might as well try to get her bred. So Doctor gave her a shot to bring her in heat and we bred her artificially to Harden Farm's King Professor.

By the time we got her situated in her stall again in the fall, I was quite sure that she would never walk out the door again. Just like an old lady, she got more and more fussy about her food—the beet-pulp had to be just so, no grain except home ground grist, and very little hay. I don't see how she kept her old bones together and grew her calf at the same time on what she ate.

C-Day arrived the day after New Year. She was calving a little early and I didn't know whether her old heart would stand the strain or not. The afternoon passed and Ag didn't seem to be making much progress. I began to fear that the calf might be backwards, because Ag had fallen so often lately, and sent for the veterinarian. The front feet were just beginning to show when he arrived, so he promptly took the calf. Ag's hip bones creaked and snapped so that I thought

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ACTUAL SIZE

Stop shoveling manure. Switch to Clay power cleaning. Hold your boys at home—keep help happier. Make barn more sanitary—less odor. *Milk inspectors APPROVE Clay cleaners.*

5 YEAR GUARANTEE

- ONE MOTOR—ONE DRIVE—ONE CHAIN
- NO STINKING, FREEZING PIT OR HOPPER TO CLEAN
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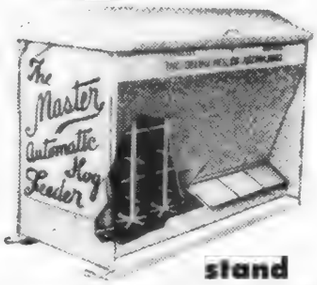

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Please rush FREE Booklet F-1, "Farm Insulation with Double Efficiency."

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AT LUMBER & BUILDING SUPPLY DEALERS

she was hurt, but Doc just laughed and said, "Old bones!"

A few mornings later we had no luck in getting her up. She just didn't want to make the effort. Long ago I'd said that if the time came when she could no longer get up and down, I'd have her put to sleep. But saying it was one thing and doing it was another. I postponed it as long as I could, saying her grave would have to be dug first.

I went around sniffing and bawling like a kid, or stood watching Ag as she lay with her head turned towards the warm afternoon sunshine, chewing her cud contentedly. I hated to think that after tomorrow I'd never see that fine head again. She had been my partner and pride for half my lifetime — the main reason for wanting better pasture, good hay, better herd management. Whatever I had learned in college or by reading, I took home and applied to her and to the rest of the herd.

The vet came Saturday and I went to the house until he had gone. Later I came out with some show blankets to cover my old cow and followed along behind as they took her down to the grave beneath the apple tree. I straightened her head and folded those weary legs under her. Then as there was nothing more that I could do for Ag ever again, I went back to the barn.

From the stanchions and boxstalls, Aaggie's offspring looked out at me and though I'm fond of them, not one could fill the place vacated by the Aaggie cow. There can never be another Ag for me—for I'll never be a kid again starting out for that first fair in the back of our old car with a high-spirited young calf called Aaggie.

THE AUTHOR: After graduating from Cornell in 1940 and a short teaching career, Agnes Pendergast married a farmer named Tommy Kane and settled down on a dairy farm. They have 50 Holsteins on DHIA near Addison, N. Y. Mrs. Kane keeps her hand in on showing, taking a few head to the Steuben County Fair each year. She hopes to find time, some day, to write a book.

RUN IT THROUGH TWICE

(*Continued from page* 67)

anytime from fall till Christmas, shooting for choice grades the next July or August. Sometimes you get a wild one that you feel like knocking in the head when he climbs all over the shoats.

Last fall Lawson put 45 six-hundred pound white face yearlings on his usual ration of ground cobs and Purdue Supplement A. The hogs following them, in addition to corn from the crib, have constant access to a 34 per cent commercial supplement. He likes to buy 75-pound shoats, for "they can take care of themselves and if they're poor or sick, they've shown it before then. But I have put in 50-pound pigs with 500-pound steers and didn't have much crippling. And I never

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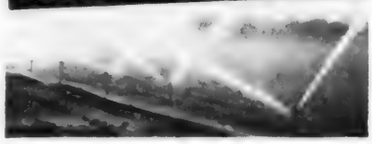

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Irrigation News

WEATHER: Made-to-order!

FROM ALUMINUM COMPANY OF AMERICA
Member of Association of SPRINKLER IRRIGATION EQUIPMENT MANUFACTURERS

VOL. 4 NO. 1 AUTUMN, 1953

Virginia Cattleman Tells How

PORTABLE IRRIGATION SYSTEM SAVES $4,000 THE FIRST YEAR!

Above: Lightweight Alcoa Irrigation Pipe being laid at Quarry Hill. Owner says the cattle and sheep seem to know what to expect—follow the system from one field to another.

Left: Quarry Hill, Hot Springs, Virginia, transformed to a fertile, green pasture—after two applications of water. Eight and six-inch Alcoa Aluminum Irrigation Pipe was used for the main line and the laterals.

Quarry Hill, Hot Springs, Virginia—Last year, in 1952, T. Kenneth Ellis of nearby Quarry Hill Farm saved $4,000 in feed bills by installing a portable irrigation system. Finding that his pasture lands were not producing sufficient silage for his cattle—even in normal years—he turned first to the purchase of feed which he estimated would cost him $4,000 a year.

Then Mr. Ellis made his decision to irrigate and within a short time had installed a system using Alcoa Aluminum Irrigation Pipe. Now, with the summer past, he tells of the results.

"It is without a doubt," writes Mr. Ellis, "the best piece of equipment I have ever bought for the farm. The response of the fields to the applied water is almost beyond belief. *Your system has certainly helped my farm!*" And he closes by saying, "I cannot tell you how pleased I am with it."

Cattlemen and farmers everywhere are learning one important fact about irrigation. While many farmers have prospered by irrigating during a *drought*, thousands of others are finding that crops harvested in a year of *normal rainfall* are doubled—even tripled—when sprinkler irrigation is installed.

Whatever your crop,
Wherever your state,
To add to your profit,
Just irrigate.

FREE BOOKLET

Mail coupon below for Alcoa's 1953 *Pipelines to Profit* Booklet containing helpful facts on planning an irrigation system for *your* farm.

Be sure you get genuine Alcoa Irrigation Pipe. Look for this yellow and blue Alcoa label.

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vaccinate any of the stock. On this point I'd like to know if I'm smart or lucky."

About April 1st, so that the cattle are on corn before going on pasture, Lawson changes the cob meal to corn-and-cob meal. The hogs follow the cattle back and forth to the pasture or the feeding stables when the fields of alfalfa-ladino-timothy are opened in May, though the hogs continue on their winter rations. They reach 225 pounds at 6 months. Brood sows and their litters are self-fed in fields.

All animals have loose salt always available and the hogs are fed a mineral mix of 10 lb. calcium, 10 lb. bonemeal, and 2 lb. salt. Cattle are fed a mineral mix of 1-1-1 and watered separately.

Solid Meat

H. F. Mellinger of Springfield, Ohio, feeds out 200 hogs to 200 calves or yearlings annually, on a one-to-one ratio. The hogs receive very little extra feed except a little hand-fed supplement. "This year," he says, "I wish I'd had ten hogs to one steer, considering the market. I believe this method makes a more solid hog, maybe only because it takes a little longer."

George T. Christopher, of nearby Tipp City, agrees with that opinion. Christopher's farm is the objective of frequent field trips for G.I. farm training classes and a place where it is worthwhile to keep your eyes and ears open. His 270 acres of corn land produce the 30,000 bushels required each year to feed his stock. Running behind cattle, his Hampshires gain 2¼ lbs. a day, and have gained as high as 2¾ lbs. (1½ to 1¾ lbs. is normal for 100-200 pound hogs). "Push them," he says, "never let them hang, or you'll pay through the nose." The sows and pigs are self-fed on pasture the year round, with shelter as needed, the ground ration consisting of 800 lbs. shelled corn, 600 lbs. oats, 200 lbs. bran, 300 lbs. 32 per cent pig supplement, 100 lbs. commercial vitamin and mineral concentrate, and 10 lbs. mineralized salt.

In addition, the pigs have access to a creep where an antibiotic supplement is available at all times. They are put behind steers when they reach 85 pounds and are at the same time on a full feed of 36 per cent supplement, 2700 lbs. of shelled corn, with 150 lbs. of vitamin and mineral concentrate, but no antibiotic.

He thinks that even stunted pigs are improved by utilizing the nutrients in steer manure, though since he began feeding antibiotic-enriched feeds to pregnant sows and their pigs, he hasn't had any runts, which used to be common in his herd. Pigs are rarely lost through injury by the cattle. Bedding is pulverized, field-baled corn stover.

The feeding sheds are kept crowded to capacity, allowing only 10 or 12 square feet per steer. Christopher provides two hogs to three steers, and though separate sleeping and self-feeding quarters are

given the hogs just outside the open lean-to steer sheds, the hogs prefer to bed down with them.

It is George Christopher's experience that grinding feed for his cattle gives better control of the mixing proportions. Sucking calves are creep fed till weaning time when they average 450 to 500 pounds, at which time they receive a full feed of 6 parts corn-and-cob meal to 1 part commercial supplement. When they reach 700 lbs. the ratio becomes 7 to 1, at 800, 8 to 1, and 9 to 1 at 900 lbs., since their protein requirements decrease as they mature. The protein lessens in the manure as well, but the protein needs of the maturing hogs following the steers decrease likewise. At 180 to 200 pounds, the hogs are taken out of the cattle lot and are finished on a full feed of corn. Lighter hogs replace them behind the steers.

Gains Vary

Since hogs reach market weights in a much shorter time than cattle, it is necessary to provide a continuous supply of hogs of the right weight. Leon Wengert of Colo, Iowa, who feeds out up to 200 hogs behind cattle, winters his steers light with few hogs behind them. No pigs are farrowed in winter. With March, June, and September farrowings Wengert is able to have hogs of the proper size available when the cattle are on heavy feed. Some state experimental farms suggest later than usual farrowing since pigs born in May or June will be of correct weight to put in with fall steers, though brood sows may be used behind steers up to four or six weeks before farrowing if active and not permitted to become too fat.

Hogs will fatten without supplement, but more slowly. Trials at the University of Missouri under Prof. A. J. Dyer show that with no extra feeds, hogs on concrete steer lots gained .9 lb. daily, which is 60 per cent or more of the normal rate full-fed. Feeders can count on two to four weeks longer to get a hog to marketable weight where no additional feed is given. If extra feed including .2 or .3 lbs. of supplement daily is provided, the fattening process should take no longer behind a steer than if the hogs were fed alone. Most farmers look on the method as a salvaging operation, and time as unimportant.

When hogs are required to maintain themselves and fatten on steer droppings alone, three times as much gain occurs where cattle are fed unground as compared to ground feed. Missouri tests produced the following pounds of pork where two-year-old steers were fed a bushel of corn in different forms: broken ears, 2¼ lbs.; shelled corn, 1½ lbs.; crushed ear corn, 1 lb.; corn-and-cob meal or ground shelled corn, a little under a ½ lbs. of pork from each bushel of corn fed the cattle. Whole corn in these tests produced more total meat, including beef and pork, than ground corn, resulting from the inability of the pigs to salvage as much of the un-

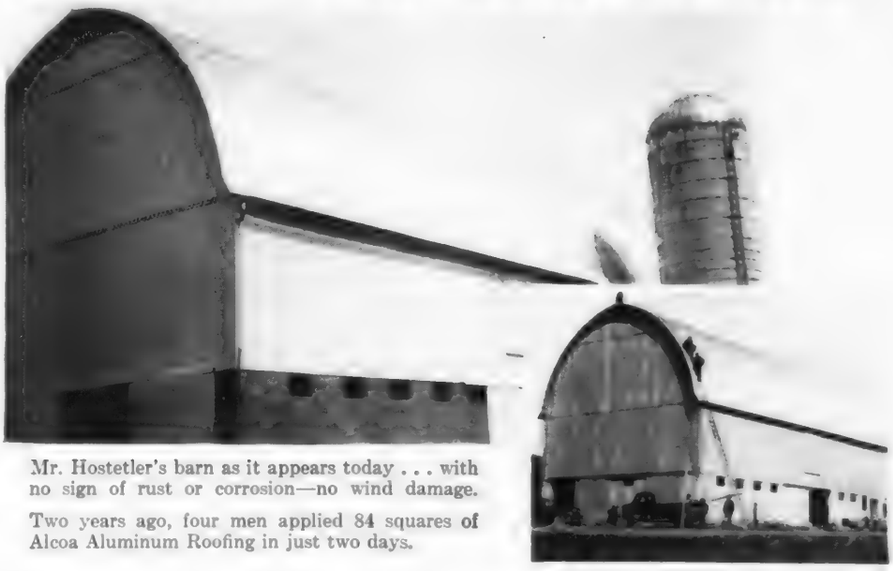
Roofing News

WEATHER: No longer a Worry! FROM ALUMINUM COMPANY OF AMERICA

VOL. 1 NO. 3 AUTUMN, 1953

Ohio Farmer Reports:

NEW ALCOA ALUMINUM ROOF "HASN'T LEAKED A DROP! NOT A NICKEL FOR MAINTENANCE"



Mr. Hostetler's barn as it appears today . . . with no sign of rust or corrosion—no wind damage.

Two years ago, four men applied 84 squares of Alcoa Aluminum Roofing in just two days.

Fredericksburg, Ohio—In February of 1951, Oris Hostetler's barn burned to the ground. Four weeks and four days later, a new Alcoa Aluminum-roofed barn stood in its place and Hostetler remarked, "Now I have a fire-resistant roof that will shed sparks as well as wind and snow."

Erection time for the 84-square roof was drastically reduced by using lightweight aluminum. Four men required but two days for the entire roofing job!

Today, after closely watching the roof during two blistering summers and as many driving winters, Oris Hostetler comments, "That roof hasn't leaked a drop! I've never had to paint it. Maintenance hasn't cost a nickel and the building is as attractive as the day we put it up! I notice my barn is cooler, too, on hot days. That gleaming aluminum keeps hot sunrays out."

What Does Mr. Hostetler Like Most About His Alcoa Aluminum Roof?

Mainly, he says, it's the way the barn stays cooler on hot days. He stores feed and houses cattle in the barn, and he frankly states that putting up hay and straw was a dreaded job before he put up the new barn with the aluminum roof! So, if you'd like more information on how an Alcoa Aluminum Roof can make farming more pleasant—more profitable, contact your local Alcoa Roofing Dealer . . . or mail the coupon, below.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

Aluminum Company of America
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Please send me (free of charge—without obligation) the 1953 Alcoa "Farm Roofing Manual."

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45% Molasses 11% Protein
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For Livestock and Poultry

digested ground particles of corn as of the unground. If the price of fat cattle is not considerably greater than the price of hogs, the expenses of grinding corn will not be justified, with hogs following.

However, the amount of pork resulting from undigested feed varies with the age of the cattle. Calves up to nine months of age do a fairly good job of digesting whole shelled corn, but from then on they become increasingly inefficient, with two-year-olds digesting their feed less thoroughly than yearlings, and yearlings less thoroughly than calves. In general, steers of any age digest a smaller proportion of the feed eaten under heavy feeding conditions and as they approach finish.

It is difficult for hogs to recover undigested grain in any form in muddy feedlots. Since Chester White of Norborne, Missouri, put in cement lots, he has been able to follow each hundred steers on a full feed of shelled corn with 25 or more shoats weighing 75 to 100 pounds. Though given no additional feed at all, they weigh approximately 240 lbs. in less than 4 months from the time they are put behind steers. In 40 years of feeding all kinds of cattle, he has almost invariably found it profitable to follow them with hogs. He finds just as much judgment is needed in feeding the hogs as the cattle. Scouring in the steers not only sets them back, but also slows up pork gains. He believes, along with many good feeders, that "pigs should be kept slightly hungry to do a good cleaning up job." Farmers frequently prefer that any extra feed given the hogs be hand fed according to need so the droppings will be well worked-over.

In sections where barley or oats, neither of which are well-masticated by cattle, are fed, the undigested kernels are not well utilized by swine. On the other hand, because grains are not easily seen in steer manure doesn't mean they aren't there. Hogs, with perhaps less-than-human eyesight, have a keen sense of smell. Chester White is able to fatten one hog to every dozen steers wintered on corn silage alone, with little undigested grain appearing in the manure. Hogs after such corn-silage fed cattle will produce about one-half pound of pork for each bushel of corn in the silage. Sorghum silage usually offers more undigested grain than corn silage. There are nutrients in the manure of steers fed grass silage, too.

While there is reason to believe that hogs would make profitable increase in weight behind dairy animals, the practice is usually confined to sows and pigs following dairy cattle on pasture, for it is questionable if state regulations would permit hogs in a loafing-barn setup for milk breeds. The fear of damage to udders discourages the practice among many dairymen as hogs sometimes nip cows.

Sanitation in any case is a must, for with any animals, disease hazards increase with crowded quarters. Brucellosis and tuberculosis in hogs are ordinarily of dif-

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ferent types than those to which cattle are most susceptible, but it pays to vaccinate for diseases like erysipelas or cholera.

Are hogs which follow cattle discriminated against at the market? Nine out of ten packing house buyers say no. They find it impossible to recognize any difference between such hogs and other hogs fed to the same weight and finish.

A survey of farmers and experiment stations boils down to these recommendations:

1. Regardless of the rations fed the cattle, following them with hogs is a sound practice, without which from 2 to 15 per cent of the feed given steers is wasted. In profits, it represents an additional $4.00 to $10.00 gross per steer fed.

2. Thrifty shoats from 75 to 125 lbs. at the start are best able to take care of themselves and have sufficient growth to begin the fattening process.

3. The ratio of hogs to cattle depends on the age of the cattle and the amount and form of grain fed. General recommendations, if no supplementary corn is given hogs: one hog to five calves, or four yearlings, or three two-year-old steers. But the wiser method is to have droppings well worked over by the use of more hogs, giving them some additional feed.

4. Most satisfactory plan is to take the hogs out at around 160 to 180 lbs. to be finished separately and to be replaced by lighter, more active shoats.

5. A protected, well-bedded area with self-feeding of the hogs on a protein concentrate (or feeding two-tenths to three-tenths pounds daily) is highly desirable to increase the rate of gain.

6. Injury and disease hazards are minor with common-sense management.

It's just good economics to produce pork if you produce beef. Dr. Snapp puts it this way, "You feed out, say 60 yearlings, on a full feed of about 18 lbs. of corn a day. Even with ground corn, five percent or nine tenths of a pound passes through undigested, from each steer. That totals just about a bushel of corn that you are wasting daily unless you use hogs.

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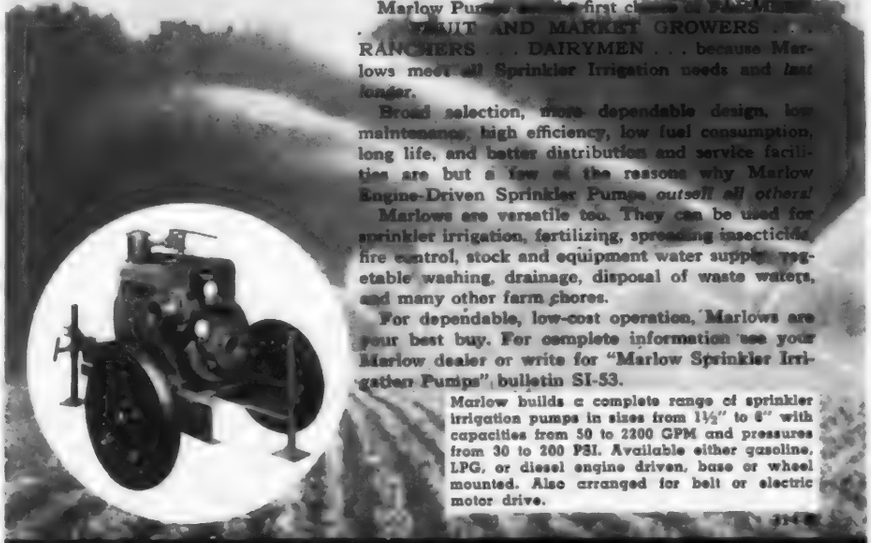

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FARM BOOKS

(*Continued from page* 22)

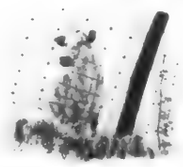
he has chapters on the control of predatory animals and the elimination of poisonous weeds. Ranchers should find his color plates on poisonous weeds particularly helpful in identifying them.

A Popular Guide to Government Publications, *by W. Philip Leidy, Columbia University Press, New York, $3.00.*

With every branch of the government issuing occasional bulletins or manuals on such widely varying subjects as How to Speak Tagalog (War Department), the Care of Turtles and Small Alligators (Fish and Wildlife Service) or Constipation (Public Health Service), it isn't surprising that the government has become one of our largest publishers.

W. Philip Leidy has not catalogued all publications put out by the government, but he has listed some 2,500 titles which were written for the layman. Farm subjects are particularly well covered with individual sections listing government publications on every major agricultural subject from beekeeping to vegetables.

The Farm Book Store



The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

SOIL AND CROPS

Range Management—*by A. W. Sampson* $7.50
How to improve the range and the livestock that graze it.

The Pasture Book—*by W. R. Thompson* $3.50
Revised edition, the 8th since 1949, of this information-packed book.

Cotton—*by Floyd Barnhart* $3.75
All aspects of cotton farming, written for the farmer.

Vegetable Growing—*by J. S. Shoemaker* $6.00
For truck farming or garden information this book is hard to beat.

Grasses and Grassland Farming—*by Hi W. Staten* $5.00
One of the best books on practical grass farming.

Principles of Field Crop Production—*by Martin & Leonard* $6.50
A new book covering the growing of every major farm crop.

Forages—*edited by Hughes, Heath, & Metcalfe* $6.75
52 experts produce a book that covers grass farming for the nation.

Colorstrip Plant Testkit $4.00
A compact, accurate tissue testing kit that can be carried in the pocket. Tells whether your crops are getting enough nitrogen, potassium and phosphorus to make good growth and produce high yields. Complete instructions come with the kit.

Soils and Fertilizers—*by Firman E. Bear* $4.50
An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson* $3.40
Fertility, rotation, drainage, erosion, tillage are covered.

Hunger Signs In Crops—*A Symposium* $4.50
How to diagnose fertility needs from the plants themselves.

Irrigated Soils—*by Thorne and Peterson* $5.50
The practice of irrigation and the management of irrigated soils.

Complete Herb Grower's Kit—*by Rosella Mathieu* $3.50
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Restraint of Animals—*by J. R. Leahy & P. Barrow* $3.75
Line drawings and text tell how to hold animals for treatment.

Breeding Better Livestock—*by Rice, Andrews & Warwick* $7.00
Practical genetics for the livestock breeder.

The Hog Annual—*by the editors of Farm Quarterly* $5.00
The latest articles and breeders' lists available to date.

A Veterinary Handbook for Cattlemen—*by J. W. Bailey* $5.00
For that emergency when you can't reach the veterinarian.

Pork Production—*by W. W. Smith* $5.50
A revised edition of this excellent book for the hog farmer.

The Livestock Book—*by W. R. Thompson et al* $3.50
This is the sequel to the best selling *Pasture Book*. It's a good one.

Feeds and Feeding (21st ed.)—*by F. B. Morrison* $7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen* $6.00
A new edition of one of the best and most complete books on dairying.

Beef Cattle—*by Roscoe R. Snapp* $6.50
A carefully revised edition of this excellent book on beef production.

Successful Poultry Management—*by M. A. Jull* $5.00
The second edition of this practical book on poultry.

FARM MANAGEMENT

Tornadoes—*by Snowden D. Flora* $3.50
All about the twisters and how to avoid being killed by them.

Guide to Government Publications—*by W. P. Leidy* $3.00
A much needed listing of agricultural and other bulletins.

Soil Development—*by E. H. Faulkner* $3.00
The author of *Plowman's Folly* starts another controversy.

Farm Records and Accounts—*by J. N. Efferson* $3.75
A practical book on keeping and using farm records.

A Practical Guide for the Beginning Farmer—*by Herbert Jacobs* $3.00
A book to give you an intelligent start in farming.

Modern Farm Management—*by Andrew Boss & G. A. Pond* $6.00
The principles and application of management to the farm.

Farmer's Tax Handbook—*by J. K. Lasser* $4.95
The latest edition to help you with your farm tax report.

The Farmer's Handbook—*by John M. White* $4.95
Easy reference book on crops, livestock, and farm problems.

Shopwork on the Farm—*by M. M. Jones* $4.50
An excellent reference and how-to-do-it book for the shop.

Making the Most of Your Food Freezer—*by Marie Essipoff* $3.00
The author of *Freezer Heresies* gives her short cuts to good freezing.

GRADE AA EGGS

(*Continued from page 65*)

the two enemies of egg quality. When the egg is first laid there is no air cell in the big end of it, but as it loses moisture through the porous shell, the air cell forms and grows larger. Heat also breaks down the firm white of an egg that makes a fried egg stand up and wink at you when it is fresh—an egg that hasn't been protected from the heat spreads thinly over the whole frying pan.

Eggs are gathered in wire baskets, since it has been found that the air flowing through them will cool them three or four times as fast as eggs gathered in a solid pail. Straw or feathers in the basket will also hinder cooling. They are stored in the basement on shelves enclosed in wet burlap where they cool until the next morning—casing eggs directly from the nest converts the egg crate into something like the old fireless cooker where AA grade eggs will quickly drop to C grade.

Cool storage is achieved by rigging a set of shelves with a water pan, the same size as the shelves, on top. Hanging from this pan are curtains of burlap sacking. When the pan is filled with water, wick action and gravity keep the sacking wet and evaporation keeps the eggs moist.

The first job in the morning is the candling, grading and packing of eggs. The cooled eggs are spun before a candling light and allowed to roll into a weighing machine which distributes them into collecting trays according to weight. Blood specked eggs are set aside for hog feed and slightly cracked eggs put into a granite-ware pan for household use. Dirty eggs are put back into a wire basket for cleaning.

Grading and packing is a two-man job which normally takes about two hours in the morning, but may stretch to three when the hens reach their peak of over 8,000 eggs a day. Once the eggs are packed, they are stored in a basement

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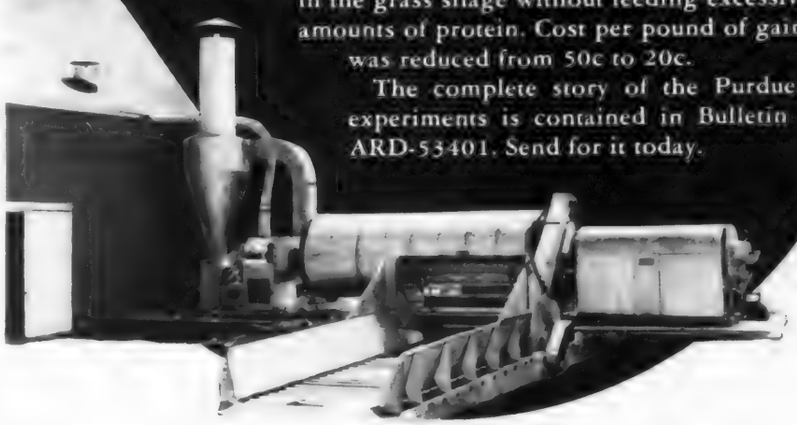
The complete story of the Purdue experiments is contained in Bulletin ARD-53401. Send for it today.



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room which is equipped with an electric humidifier. The natural coolness of the below-ground room and the high humidity created by the humidifier—a device which blows a fine fog-like mist into the air—keep the eggs in top condition until they are collected twice a week.

A dirty egg has no sales appeal and a dirty egg or an egg that has been washed will not keep as well as a clean egg. The porous shell permits bacteria from the dirt and the wash water to enter into the egg and cause it to spoil. There are a few tricks in washing eggs, however, which will help prevent this. Using water which is warmer than the egg causes the contents of the egg to expand; this will tend to force the bacteria out of the pores of the egg-shell into the water. A detergent with a sanitizing agent in it will also help prevent bacterial contamination of the eggs. Eggs which are dried immediately after washing and before they are cooled will stay fresh longer than those which are cooled with wet shells.

At Smith's farm, the dirty eggs are washed automatically. A wire basket of dirty eggs is lowered into the tank of warm cleaning water—the water is 120 degrees Fahrenheit and contains a tablespoon full of detergent-germicide to the gallon. A flip of a switch starts air bubbling vigorously through the cleaning fluid and swirling the sudsy liquid around the eggs. Three minutes of this and the eggs are lifted out, rinsed off with a spray of clean water, and wiped dry as they are transferred to a clean, dry basket. Most of the eggs come out clean, but some have to be cleaned with a brush, and stained eggs are buffed with a little Old Dutch Cleanser.

"They tell me that in California they use ultra-violet lights to detect washed eggs and that they discount them two cents a dozen," Smith said, "but our association hasn't started to dock us for washed eggs so long as the washing hasn't lowered the grade of the egg. As a matter of fact, I've heard of farmers who follow the practice of washing every egg on the farm rather than bother with separating the dirties from the clean eggs. I don't think I'd do this myself, but I don't think it would do much harm if the eggs were sold for immediate consumption."

At the Poultry Producers' Association in Versailles, Ohio, where Smith sells his eggs, Ernest Hemmelgarn, the State-Federal Inspector, will tell you, "Omer Smith is the exceptional poultryman who is getting a lot of his eggs into the double A grade. Most farmers just don't seem to realize what heat and poor handling will do to eggs. They wouldn't dream of leaving a pail of milk out in the sun for a few hours, yet that's where the eggs get left a good piece of the time and they are almost as perishable as milk."

Hemmelgarn, who checks on the work of a score of egg candlers, walks through the dimly lit room and gives his guess

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about farm practices behind the eggs. Looking over the shoulder of a candler, he points out how the light is freckled through the shell of an egg. "Here is an egg that has dried out to the point where the membrane is shrinking away from the shell. That egg will grade a low B or C." He watched a few more of the same kind go by and said, "My guess is that this farmer lets his chickens out during the day—notice how loosely the yolk spins and how distinct its outline is: that means a watery white—and that he keeps the eggs in the cellar, but that it is a dry cellar. You can sure tell these old German cellars with their damp brick floors by the quality egg that comes from them. This man probably has a good dry cellar and his eggs suffer for it."

He walked along the line of candlers. "Look at these eggs. Most of them have been packed big end down: see how off-center the yolk is. If they'd been packed right with the little end down, they would have brought three cents a dozen more."

He looked at the tag on the case of eggs the next candler was handling. "Here's a producer from over in Richmond, Indiana. One week he'll have a high B grade on his eggs and the next week it might be a low A. It all depends on the weather. I know for a fact that it would pay him well to fix up an egg room and jump his grade to the A and AA classes."

After watching a candler grade out several dozen eggs and then come on a flat of B and C grade eggs, Hemmelgarn remarked, "It is easy to tell what happened there. If there are just a few of the low grade eggs it means that they found a nest that the hens had made on the floor. If there are a lot of them, it means that Mom wasn't home and Johnny left the basket of eggs out on the back porch instead of putting them in the basement."

At the end of the room on a desk lay a sheaf of checks that were being mailed out. "There's the pay-off." Hemmelgarn said, pointing to the settlement report attached to each check. "The large double A whites are selling for 55 cents today and the grade C whites are selling for 44 cents. It takes just as much feed to produce the one as it does the other, but the man who is taking care of his eggs is making $3.30 a case more than the careless fellow."

HOME-MADE BREAD

(*Continued from page 63*)

400 degrees for 10 minutes to compensate for the cold dough. Then reduce the temperature to 350 degrees and continue baking for 35 minutes more. With fewer loaves the compensation is less, of course. And remember, if you're tempted to open the oven to peek at the loaves, you drop the temperature about 100 degrees each time you do it.

When the bread is done, it shrinks away from the sides of the pan and sounds hollow when tapped with the finger. As soon as the loaves come out of the oven, we immediately dump them out of the pans on their tops to reduce the excess moisture. In about 15 minutes we turn them right side up on a perforated rack. The extra screens for our seed cleaner make fine racks. Regular bread racks are available, of course, from bakery supply houses and larger hardware stores.

Variations on this basic loaf are as many as kinds of flour available. The principal thing to remember in working with other flours is that they do not have as much gluten as wheat and, therefore, make a denser bread. On this account we

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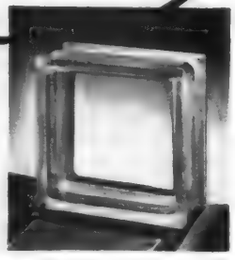

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like to make half-and-half loaves, or two-thirds whole-wheat flour and one-third rye, or barley, or corn, or rice flour. One variety we like very much is a Colonial loaf—one-third whole-wheat, one-third whole-rye, and one-third whole-corn flour. We often add raisins to our whole-wheat bread, plus a sprinkling of cinnamon on top, for additional variety.

When making rye-and-wheat bread we throw in caraway seeds and replace the honey in the recipe with unsulphured molasses. That bread, spread with home-made butter and topped with a slab of imported Holland Edam or Swiss cheese, will stand by you while you build a dike or climb a mountain. This bread is called "maslin" in Europe and is not to be confused with pumpernickle, which is darkened with caramel.

A 100 per cent whole-rye bread can be like a brick, just as heavy and hard, unless you know the art of making a "Sauer," which is a complicated method better left to experts. The rye bread of commerce is not rye bread at all, but 90 per cent white wheat flour and 10 per cent white rye flour with the germ and bran removed. It is called "rye" solely out of courtesy and by government consent.

Old-Fashioned Sponge Method

Another basic way for making bread is by the old-fashioned sponge, or starter, method in which you save back a portion of each batch of bread to start the next. Mrs. J. C. Turner, who lives on a 600-acre farm near Rising Sun, Indiana, has always made bread this way.

"I used to watch Mother make bread when I was a girl on the home farm," says Mrs. Turner. "For her bread Mother used a sponge, or starter, instead of yeast. She called it an 'Oklahoma starter,' which is different from a regular potato sponge and is made as a part of the bread itself, not separately.

"When I married she gave me two cups of her sponge to start my own bread making. In 33 years of baking, I've lost this starter only once. That was about three or four years after I was married. Luckily a neighbor had some just like that I'd been using and she loaned me a cup of hers to start again. For 29 years now, I've kept going on my own.

"I sometimes stop to wonder what in the world I would do if I lost my sponge again. I don't know where I could get the loan of another one since so few women bake their bread at home now, and I have never made one from scratch. Though I've never tried it, perhaps one could be made with yeast, just like the potato sponge is made when there is none left over."

Her sponge method takes longer than yeast bread or potato sponge bread because there is an extra raising in the process, Mrs. Turner says, but otherwise the procedure is about the same as that for making all raised breads. This is her recipe for 5 loaves:

If no starter is available, it may be made with yeast in this way: Mix ¾ pound of flour with 1¼ cups boiling water. Add 3¾ tablespoons sugar and 1½ tablespoons salt and enough cold water to make 3¼ cups liquid. Let the mixture become lukewarm, then add 1 cake of compressed yeast which has been dissolved in 1⅛ cups lukewarm water.

Allow this mixture to stand overnight. In the morning it should be light and frothy. Stir it well and remove 2 cups to save and be used as the starter. The remainder is ready for use.

Put 2 cups of sponge in a gallon-size crock, or mixing bowl.

Add: 5 tablespoons sugar, 1 quart *lukewarm* water, 6½ cups sifted flour, mix thoroughly, then set in a warm place to raise to the top of the crock.

Add: 4 tablespoons salt, 1 pint lukewarm water, 9-10 cups sifted flour (save a little of this to use on the board when kneading).

Mix these ingredients by hand, then turn out on a floured board and knead until the dough is smooth and elastic.

Put back in the crock and let raise in a warm place until about double in bulk.

Take out and knead slightly.

Measure into 5 equal portions, shape into loaves and place in greased 4" x 8" pans.

Let raise in a warm place until double in bulk and until finger dents remain. The dough will seem much lighter when "hefted" than before it was set to rise.

Bake in a 350 degree oven for 1 hour.

"While the bread is rising the last time," Mrs. Turner says, "I take care of the starter I set aside for my next baking. I sprinkle a little sugar over the top of it to help it ferment and let it rise to the top of the crock. Then I stir it down, put a plate over the top and store it on the bottom shelf of the refrigerator. It keeps cool enough there not to sour—which it might do if left out in the hot summer—but doesn't freeze. Trying to store her sponge in the winter time so it wouldn't freeze overnight used to be one of my Mother's biggest worries. Freezing ruins the fermentation process and the bread won't rise then.

"The starter will keep for about a week as I store it. If for any reason I don't bake twice a week, as I usually do, though, I mix a tablespoon of sugar and about the same amount of flour into the starter. That freshens it and makes it just like new so that it will keep until I do bake again."

Potato Sponge Bread

"A lot of our friends made their bread with a potato sponge when I was a girl," Mrs. Turner adds. Occasionally, Mother would use this recipe:

Boil 3 potatoes, mash or beat soft in the water.

Add:

3 tablespoons honey
1 tablespoon salt
1 cup starter left from previous baking
Enough warm water to make 3½ cups mixture.

If no starter is available, dissolve 1 yeast cake in a cup of tepid water, add the potato-honey-salt-water mixture and allow to stand overnight.

Next day take out 1 cup to use next baking, then mix the remainder thoroughly with

3 tablespoons fat
10 cups sifted flour
3 tablespoons honey

Let the dough raise for 2 hours.

Turn out on a board and knead a few minutes until dough is smooth and resilient.

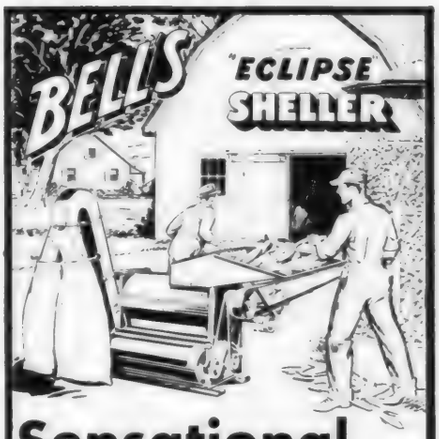
Let dough stand 10 minutes to recover.

Shape into 3 loaves, place in oiled pans.

Raise in warm place until finger dents remain.

Bake 60-70 minutes at 350 degrees.

"When the bread has finished baking," Mrs. Turner says, "I grease the top, then turn it out top down on a cloth or rack and let it cool before storing. I keep my loaves covered with a cloth in a special ventilated drawer in my cabinet. But with a family that likes home-made bread as



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When you base the efficiency of a dairy cow on the amount of total milk solids produced per unit of body weight or per unit of feed consumed, you find the Jersey breed at the head of the list. And regardless of the standard used in pricing milk, you find Jersey milk bringing more money at dairy plants. Why? Because its extra protein, minerals, vitamins, fat, etc., make it worth more.

Now the thing that dairy farmers often overlook in judging the worth of a dairy cow is her ability to produce large amounts of high quality and top selling milk year after year. And that is where the Jersey really shines. Notice the production of Opal Crystal Lady. She is an example of how Jerseys excel in production persistency and profit consistency.

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7-8	365	23,725	1,237
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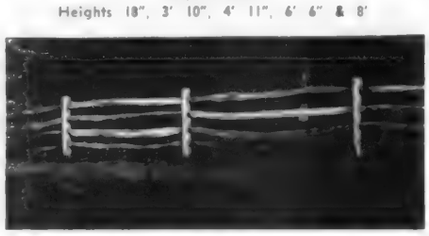

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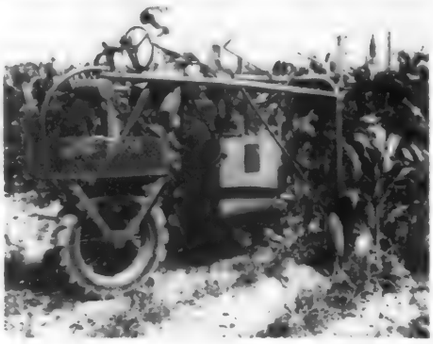

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much as mine does, it doesn't stay there long. I guess that's one reason I still make bread at home.

"Another reason is—if I count my work as free of charge—baking bread at home is much cheaper than buying it ready made. Bread costs about 20 cents a loaf these days. I get a 25-pound sack of Robin Hood flour for about $2.00. This will make 25 loaves of bread which, if bought, would cost about $5.00. So I figure that I get my bread for half price. This means a lot when six people with healthy appetites sit down to the dinner and supper tables each day."

To Tell of Taste

Now for the hardest part—to describe the flavors inherent in whole-grain, home-made bread.

The French and Italians, knowing of these things better than we, have just the right expressions. "Bonne mouche" (good mouth) is the sensation you experience when eating it, and the purpose is surely "per amusare la bocca"—to amuse the mouth.

THE AUTHOR: After graduating from the University of North Carolina in 1932, Alden Stahr tried his hand first at writing advertising copy and then at public relations. For the last nine years, he has farmed 198 acres on the Delaware River in New Jersey. He is editor and publisher of *Natural Living* magazine and is vice-president of Natural Food Associates, an international organization to promote better foods from better soils.

The Aunt Vinnie incident came from the facile pen of J. M. Eleazer, of South Carolina, whose nostalgic prose has often appeared in THE FARM.

CIDER

(*Continued from page* 43)

The hand presses were simple—a grinder to chew up the apples and a press operated by a screw, both mounted on a wooden stand. The large presses had greater capacity, for water or steam power were substituted for hand power. The chief drawback of the small hand press is that it will not exhaust the pulp of all its juices. The first juice from a run is the free juice released as the apples are ground. This has no "body". As the pressure increases the juice gets heavier and more flavorful.

Cider made from a mixture of apples is better than that made from a single variety. For example, the juice from the Grimes Golden is almost colorless, and bland; from the Delicious very sweet.

At a commercial cider mill today, your apples are scooped into a hopper and from there are carried by a chain or belt conveyor to the grinder or chopper. The resultant mass of juice and pulp is about the consistency of thick apple sauce. It includes skins, cores, seeds, and an occasional worm. A decayed spot in an apple discolors the cider and damages the flavor. The same can be said of a worm. Though spots can be cut out and the good part of the apple used, it is not always possible to detect a hidden worm. Shakespeare knew that, for he speaks of "a goodly apple, rotten at the core". In the old days, before we became germ conscious, the apples were not washed. Today

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the apples are thoroughly cleaned under high pressure water, which also eliminates most of the danger from residual sprays.

From the chopper the pulp falls into a bin directly above the press to await the pressing operation. A slatted wooden board is placed on the platform of the press, and a frame, with sides several inches high, set on the board. Then a cloth, made of burlap or similar material, is laid over the frame and the pulp is allowed to run out until the frame is heaping full. The cloth is folded over the pulp, corner-wise. Then the frame is lifted off, another slat board is placed over the first layer of pulp, followed by the frame and another cloth. The capacity of a hand press is 6 to 8 layers; that of a power press, 8 to 20 layers. This stack of prepared pulp is called a "cheese". The press is then set in operation, squeezing the juice out between the slatted boards and through the cloth. The juice runs into a trough at the base and thence into a barrel or tank. It may pass first through a filter or clarifier.

A large hydraulic press will turn out 300 gallons at a pressing. A hand press, using a cheese from 6 to 8 layers, will turn out about 12 gallons at a pressing from 4 to 5 bushels of apples. A hydraulic press will get 16 gallons of juice from the same quantity of apples.

On the larger presses the pressure may go as high as 22 tons, applied from the bottom. About 8 tons pressure, applied from the top, is the limit of a hand press. A heavy press will get up to 75 per cent of the juice out of an apple, which is 86 per cent water.

After the cheese is devoid of its juices, the pomace, or "pummies" as the old-timers called them, are shaken out of the cloth. Today pomace is used as cow or hog feed, but formerly it was dumped behind the mill and was the source of a pungent, distinguished odor which covered the neighborhood. It is legend that in one of these heaps of pomace, a "sport" seedling, later to produce the first Delicious apple, grew up.

On the more elaborate modern jobs, the cider is shunted through a clarifier and a pasteurizer before it is packaged. A clarifier is nothing more than a filter, similar to water filters used in cisterns. Cider is sometimes clarified at home by adding casein powder or egg albumen, which causes sediment to coagulate.

The flash pasteurizer quickly brings the juice to 180 degrees, killing all bacteria and enhancing the keeping qualities. Cider can be pasteurized in an ordinary stewpan by heating it to 180 degrees.

The price for making cider varies with the locality and competition. In the New England apple country last year the price varied from $2.25 to $3.50 for a fifty-gallon barrel. In the Midwest, where cider presses are almost as rare as horses, the price went to $5.00 a barrel. In amounts smaller than a barrel, a gallon

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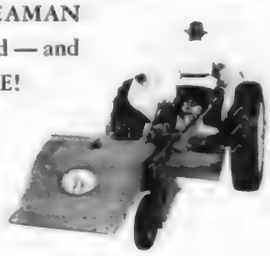

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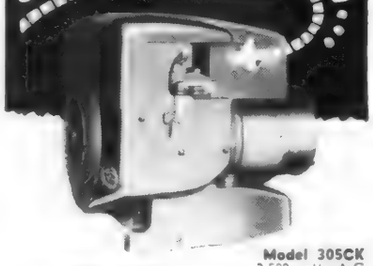

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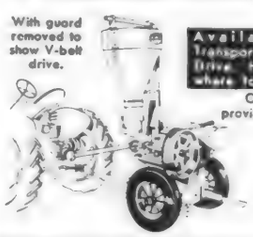

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rate is charged. This ranges from 10 to 15 cents. On the open market cider sells for 50 cents to $1.00 a gallon, depending on locality.

Besides pasteurization, there are other ways of preserving apple cider as a beverage. The most common is the addition of benzoate of soda, the preservative used in commercial catsup. The proportions are 2.5 ounces of benzoate of soda to 20 gallons of cider. Other chemicals used to arrest fermentation are potassium metabisulfite and sulphur dioxide. All chemicals alter the flavor and no cider fancier will permit this sacrilege.

Another method is to bring the cider to a boil and then seal it in bottles or jugs. The old timers used to drop a burning rag, dipped in sulphur, into the barrel. All these methods are designed to arrest the growth of yeast bacteria. Low temperatures will do this, too: a jug of cider will remain drinkable for two weeks if kept in the refrigerator. Cider can be kept indefinitely in a deep freeze. Freezing also enhances the kick of hard cider—the water freezes, the alcohol remains liquid, and can be poured off. All preservative measures take away flavor, and when it's all said and done, the only way to get cider in its prime is to take it as it leaves the press. If not refrigerated, cider gets too sour to drink in about 10 days of average fall temperatures.

Pasteurization and boiling are only temporary measures, for eventually fermentation bacteria gain entrance from the air, and then the cat is out of the bag.

Budde & Westermann, 350 Broadway, New York, N. Y., make a fruit crusher which sells for $35.00 and a ratchet press for $32.50. These are typical prices for the simple hand equipment.

The A. B. Farquhar Co., York, Pa., (a division of the Oliver Corporation) makes a small hydraulic press of 600 gal. per day capacity priced at $1200, complete with grater, elevator, motor, racks, cloths, and tank. Farquhar's big commercial press sells for $4620. This is for the press only, which has a capacity of 15,000 gal.

Other manufacturers of cider making equipment include Palmer Cider Supplies, Cos Cob, Connecticut, Dunning & Boschert Press Co., Inc., Syracuse, N. Y., and the New Jersey Agricultural Works, Trenton, New Jersey.

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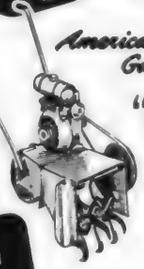

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ADVANTAGES: Quiet operation. Easy to install. Water cooled and lubricated pump and motor, made of corrosion resistant metals. Requires no pump house. Entire pumping unit including sealed-in motor located in well.

Deming Submersible Pumps are designed for 4-inch and larger wells of 40 to 400 feet in depth. Capacities range from 170 to 1500 gallons per hour.

BULLETIN 6700

Contains complete description and selection tables. Write for your FREE copy now.

THE DEMING CO.
510 Broadway
SALEM, OHIO

(*Continued from page 47*)

iron wedges since they will not blunt the chain if it accidentally hits them. An automatic clutch on the chain saw comes in handy when the tree pinches, for a saw without one will stall its engine at this point and make it necessary to start again and again until the tree is felled.

When it is absolutely necessary in making the backcut to fell a tree directly uphill, the crew should be exceptionally careful, because a tree felled in this direction acts in as unpredictable a way as the weather. It may bounce when its branches hit the slope, kick the butt back over the stump.

Make some preparation to prevent the tree from staying on the stump when it lands because if it doesn't break clean of the stump, splitting may occur. By undercutting the stump below the cut, the tree usually will leave the stump clean.

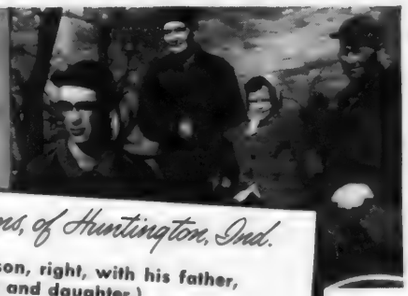
The path of retreat should be laid out before the backcut is started. During the cut, keep alert and ready for a quick getaway. Never cut with the throttle locked open. The moment the tree starts to tip, shut off the power, put the saw on the ground well back from the stump, and keep going another 25 to 30 feet.

After the tree is felled, the branches and limbs are removed. The ax may be used here to lop off the brush and smaller branches before using the saw on the heavier limbs. Then the undercutting and bucking are done to cut the remaining log into lengths. The effect of the cuts should be studied before they are made. By taking advantage of the way the tree lays, a bucker can speed his job and save energy. He should decide which cuts to make first to use to advantage the weight and strains of the tree as applied to different places when it is resting on the ground. These stresses and strains can open a cut after a chain saw and make it possible to buck without wedging, or the opposite can happen and the log can close over the cut and make constant wedging necessary.

Undercuts are handy on limbs supported at both ends. Be sure the bumper is tight against the tree before the chain touches, or the pull of the teeth will jerk the saw sharply. During the cut be ready to pull out fast.

When much weight is over-hanging, it is best to make a bucking cut from the under side of the log. When this cut is three-fourths through, take the saw out and make a regular bucking cut from the top, meeting the undercut. The wood left after the undercut will hold the log together and make it possible to complete the cut without pinching. This method is also helpful if the log is lying on the side of a hill where the butt end may roll and swing around. This movement will pinch the saw tight and twist the log when cut through, tearing off a large slab from the log when the cut portion breaks.

3 Generations of American Fence Users!



The Thompsons, of Huntington, Ind.

(Glen Thompson, right, with his father, son and daughter.)

"My whole family uses American Fence. We find it's easy to stretch. It stays stretched tight, too," *says Glen Thompson*

● The Thompsons *know* that American Fence is long lasting. Glen Thompson's fence has been up about 20 years. His father has some that is even older. Naturally, Glen's son uses American Fence on *his* farm too. Three generations of American Fence users!

Glen Thompson raises corn, oats, clover and alfalfa on his 160-acre farm. He also has over 100 hogs and 18 milch cows. His fence *has* to be good to keep those animals where they belong! With his sturdy American Fence, Glen Thompson uses American Barbed Wire and American Steel Fence Posts, too. Reports Mr. Thompson, "I use the American 'U' Posts and they help speed up the fence stretching job . . . keep the fence good and tight."

American Fence has *proved* its staying power, on thousands of farms. Why not make it "American" the next time *you* order fence? It'll serve you well . . . and long.

6 favorite features of American Fence

1. Heavily galvanized wires
2. Hinged Joint construction keeps its shape
3. Full gauge wires
4. Tension Curve allows for expansion and contraction
5. Correct spacing of wires
6. Full length and height

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COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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U·S·S AMERICAN BARBED WIRE: Five styles to choose from . . . a wide range of weights in 2- and 4-point barbed wire. Well-formed, sharp, accurately-spaced barbs on full gauge wire. Comes neatly wound in 80-rod spools.

U·S·S AMERICAN STEEL FENCE POSTS: Easy to drive . . . no holes to dig. Slit wing anchors root posts into ground. Comes in "T" or "U" types.

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There's more American Fence in use than any other brand!

UNITED STATES STEEL

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NOW ONLY $228.50
16" SIZE • F.O.B. ASHLAND
EASY STARTING — Even in zero weather — no fussing or fuming!
EASY RUNNING — Engineered with minimum of vibration. Easiest day's cutting you ever did!
EASY TO USE — This is the saw chosen by professional pulp cutters as being easiest to use in all types of cutting.
EASY ON YOUR POCKETBOOK — First because it's priced so low, second because it's so finely built that it stands up and works day in and day out with minimum of upkeep.
CUTS TO WITHIN ¼" OF THE GROUND
LIGHT AS AIR TO HOLD IN PRUNING.
BEST IN THE LOW COST FIELD — FOR BUCKING THE BIG ONES.
Model 5 HP 5
CHAIN SAW
BEATS 'EM ALL!
ONLY $305.00
20" SIZE • F.O.B. ASHLAND
HERE'S A REAL POWERHOUSE
Tremendous power harnessed in a compact, easy handling unit that cuts the big ones down — and fast! If you are cutting the big stuff, be sure to see this powerhouse before you buy.
CUTS IN ANY POSITION
TREMENDOUS POWER. PERFECTLY BALANCED FOR EASY HANDLING.
EASY TO GET A DEMONSTRATION From Coast to Coast Lombard's dealers are waiting to give you a demonstration of these remarkable new saws. Use coupon below.
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CITY STATE

Take it easy when the log is flat on the dirt, because stones can blunt a chain in an instant. The best bet is to stop about an inch from the ground, then roll the log and separate the pieces.

Maintenance

Keeping the chain in good shape is one of the most important maintenance jobs connected with the chain saw. Each saw comes with specific instructions for caring for the particular type of chain used. Some give detailed information on filing the chain at the farm. Others suggest it best to send the chain to the dealer or the factory for expert dressing.

Most of the maintenance jobs which fall to the chain saw owner should be preventive maintenance. Most chain saw owners will tell you that this includes keeping the saw parts clean and tight and the saw fueled with the proper mixture. The chain should always be kept in good cutting shape. Along this line comes such items as removing the sawdust and dirt after each use of the saw so that complete inspection of the saw can be made: tightening loose nuts and screws: keeping the fan screen clean: checking the fuel and oil line connections for leaks: seeing that the air filter is clean: checking the cutting chain for worn or loose rivets: and checking any unusual noise or vibration.

What the Manufacturers Offer

Here is what some of the manufacturers offer in the way of chain saws for general cutting jobs:

1.) The newcomer to the chain saw field is the Clinton Machine Company. It offers a belt-driven, cool-running, two-cycle, single-cylinder 2hp. engine which weighs about 26 pounds. With a 20″ cutting blade the saw costs $239.50, with a 26″ blade the price is $247.50, and with the 30″ blade the saw is priced at $255.50 A bow saw attachment for the same engine is available. A helper's handle may be added for two-man operation.

2.) Disston's DO-101 is an all-purpose saw designed for either one-man or two-man operation, powered by an air-cooled Mercury gasoline engine which develops 3½ hp. at 4,000 r.p.m. This one powerhead will take narrow profile cutting blades in 20′, 26″, 32″, 36″, and 40″ sizes. A 16″ one-man bow saw attachment may be used on the same engine. Cost of the saw with a 32″ blade is $339 and with a 20″ blade, $322. These units may be converted for two-man use by attaching a handle which sells for $9.00.

3.) For the owner of a 5 hp. Gravely tractor, Gravely Tractors, Inc., offers a chain saw attachment. The standard 24″ blade attaches to the front of the tractor and is adjustable to any angle and any position with a clamp adjustment. Cost of the attachment is $139.50 Longer bars may be bought on special order.

4.) Hoffco, Inc., produces a tool which is designed for light cutting jobs. It is the Sawette, a chain saw cutting blade which attaches to the end of a 42″ tube with the engine at the other end. The tool is supported by a sling over the shoulder. This saw permits the operator to cut level with the ground while standing in an upright position. Powered by a 2 hp. engine, the 12″ cutting blade is particularly adapted to limbing trees, clearing small stumps, cutting growth with heavy overhang, and trees up to 8 inches in diameter. It weighs about 26 pounds and is priced at $187.50.

5.) Homelite Corporation produces a chain saw for almost every type of cutting. The 4 hp. engine which powers their Model 26 chain saws is available as a one-man saw with an 18″, 23″, or 28″ blade, and as a two-man saw with a 34″ or 42″ blade. The 23″ blade size is the most popular for one-man use. A helper's handle may be attached to the 28″ one-man saw. An 18″ plunge-cut attachment may also be used with the engine.

Weight ranges from 27 pounds for the 18″ straight-bladed saw to 39 pounds for the large 42″ two-man saw. Price varies from about $325 for the small saw to around $400 for the 42″ job.

6.) Von Ruden's Hydra-Flex chain saw, the only hydraulically powered saw in the field at present, will operate off all tractors having a six-spline rear power takeoff shaft, except the

Cub Farmall and Allis-Chalmers "G". It is not intended for garden tractors.

The oil supply tank has a 5-gallon capacity. The saw is connected to the pump by 10′ hoses. If a wider radius of operation is wanted, 20′ hoses may be bought for an additional $26.

The one-man Hydra-Flex saw with 18″ cutting blade weighs about 25 pounds and costs $290. With the 27″ blade the saw weighs 30 pounds and sells for $300. The permanent two-man 32″ saw costs $315 and the 46″ two-man saw sells for $330. A helper's handle which converts the one-man saw for two-man use costs $7.50.

7.) The Lombard Governor Corporation produces the Woodlot Wonder saws. Model 30 has an air-cooled gasoline engine of nearly 3 hp. and may be coupled with either a 16″ or 20″ cutting blade. Price with the smaller blade is $228.50. Lombard's Model 3A chain saw with 16″ cutting blade costs $265. With the 20″ blade it sells for $271.50. Their 5-hp line starts at $305.

8.) The Mall Tool Company's new 2MG chain saw features a 5 hp. high-compression engine and a cutting bar which may be indexed 360 degrees so that cutting from any angle is possible. Bars are available from 18″ to 54″ and the weight of the unit varies from 29 to 39 pounds depending on the size blade used. Price of this model starts at $295.

A bow saw attachment and an earth auger which drills holes 30″ deep for posts, poles, and seedlings may be attached to the 2MG engine.

Mall also offers a model 12A which is a 3½ hp. saw which sells for about $255 with the 18″ cutting blade.

9.) McCulloch Motor's 1953 chain saws feature the 3-25 model. Weighing about 25 pounds and powered by a 3 hp. engine, the saw is available with 14″, 18″, 24″, 30″, and 36″ blades. A 15″ bow saw attachment is also made. Price of the saw with the 18″ blade is $265. with the 24″ blade it costs $275. McCulloch is introducing a chain saw for farmers which weighs 20 lbs. complete and sells for $255. It will cut trees and logs up to 3 feet.

10.) Precision Equipment, Inc. makes two saws which it recommends for general cutting jobs—the Bow Saw and Beaver Tail saw. This manufacturer considers the Bow Saw as the least dangerous of

SAVE ½ ON FARM BUILDING COST WITH NATIVE LUMBER

The Belsaw ONE-MAN Sawmill produces smooth, true-cut lumber from any farm wood lot . . . Easily handles logs 8″ to 36″ in diameter. Low-Cost Belsaw can be powered with tractor or old auto engine. Requires no previous experience. FREE Book tells how to *save* with native lumber . . . Send today for your copy of "How To Make Lumber".

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The 2 h.p. **Hoffco** PAT. PEND.

POWER UNIT AND ATTACHMENTS

THE ANSWER TO EVERY GROWTH-CLEARING PROBLEM!

New 2 h.p. HOFFCO POWER UNIT, using SAWETTE, TRIMETTE, and SCYTHETTE attachments, clears weeds, brush, trees! You stand safely upright, cover ground 400% faster with HOFFCO. Light-weight—powered for heavy-duty jobs—small or large. Take the labor out of clearing—use the HOFFCO POWER UNIT—with SCYTHETTE, SAWETTE, and TRIMETTE!

POWER UNIT PRICE . . . $123.00 F.O.B. factory.

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Sawette HOFFCO's SAWETTE works easily on smallest brush—or trees up to 8 inches and over in diameter. America's outstanding chain-saw!
CUTTING HEAD PRICE, $64.50

Trimette Use TRIMETTE to trim near walks, stones, drives! 7-inch blade creates suction, distributes mulch evenly. Save work—with TRIMETTE!
PRICE TO BE ANNOUNCED

Scythette SCYTHETTE clears weeds anywhere—even under water! Snips off saplings up to ¾-inch in diameter. No job too big or difficult for SCYTHETTE!
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RICHMOND, INDIANA

Try this revolutionary, new, **ATKINS**

Chamfer Saw Chain

for the easiest cutting you've ever known!

AVAILABLE NOW FOR EVERY MAKE OF CHAIN SAW!

IT'S THE CHAMFER THAT DOES IT!

- Cuts Straight
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SEE how this new design hugs any cutter bar . . .
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THROUGHOUT THE YEAR

Fill in your empty brooder houses with Hubbard New Hampshires

The USDA reports that a hen at the 200-egg level is three times as profitable as one that lays 167 eggs. So fill up your empty brooder houses, and buy Hubbard Breeding. Make extra profits with Hubbard New Hampshires. These chicks from pedigree ancestors inherit the capacity for a flock average of 200 eggs or more on a hen monthly basis.

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CUT WOOD · CUT COSTS · KEEP GOING!

Before you buy, see TITAN work! Titan Series 40 power chain saws combine lightweight, ruggedness and long life. Proved by thousands of Titan owners. Made by the pioneer specialists of power chain saw manufacturing, the Titan 40 does all woodcutting jobs well. Maintenance costs are lower—performance is higher!

PRECISION BUILT FOR ANY JOB

This one or two man saw fells hard or softwood trees quickly; crosscuts; squares timbers; prunes; cuts posts, firewood. Precision built with automatic clutch and chain oiler; rotating parts ball and needle bearing mounted; self-winding starter; 18" to 60" blades. See your TITAN dealer today!

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DEALER INQUIRIES INVITED

its saws because the chain itself is two-thirds under cover.

The Precision gasoline engine used with both the Bow Saw and the Beaver Tail saw develops about 3 hp. The Bow Saw is available with 18" blade only, but the Beaver Tail comes in both 20" and 28" lengths. A helper's handle may be attached to the 28" model.

11.) For general farm use, the Reed-Prentice Corporation recommends its new Timberhog Bantam. This one-man saw, weighing 32 pounds, comes with an 18" cutting blade as standard equipment, but a 22" blade is also made to fit the engine. The engine develops up to 3 hp. and features an automatic clutch, rewind starter, and automatic chain oiler. It sells for $275 F.O.B. the factory.

Model 50 is a 5 hp. saw which is available as either a one-man or two-man saw and will take 24", 30", 36", and 48" cutting blades. The two-man saw with 30" blade weighs 55 pounds and is priced at $390. As a one-man saw with 20" blade, it weighs about 45 pounds. This model costs $346. An extra chain costs between $25 and $30.

Reed-Prentice also makes a variety of air-driven and electric-driven saws.

12.) Model 3-19, manufactured by the Strunk Equipment Company, is a one-man chain saw available with a 19" or 24" cutting blade and weighs about 28 pounds. The saw is powered by a gasoline engine which develops just under 3 hp., has an automatic rewind on the starter and a built-in no-kick-back feature. It permits handling from two positions and cuts within a half inch of the ground. The model with 19" cutting bar sells for $239 F.O.B. the factory.

13.) Titan Chain Saws, Inc. recommends its Sportsman and Series 40 models for general farm use. The Series 40 saw has a 5 hp. engine and a 24" blade which may be adapted for two-man operation. Weight of the motor alone is about 30 pounds. This saw is considered by its manufacturer to be a good all-round saw for felling, cutting cordwood and posts, clearing land, pruning, and squaring timbers.

The newest of the Titan saws is the Sportsman which is designed as a general utility saw on farms, in orchards, and around the home. The 14" blade will fell trees up to 28 inches in diameter. It sells for $265 F.O.B. the factory.

CUSTOM FARMING

(*Continued from page* 75)

good example of a fair way of establishing local rates.

Lew had gone straight through the ceiling when Fred asked him $200 for raking and baling his 20 acres of hay. But Fred was a patient man and when the air had cleared, he sat down and explained the dollars and cents aspects of custom farming to his neighbor. With everything on

paper the $200 item didn't look so far out of line.

"Look," Adkins explained, "I have $2,900 cold cash invested in my baler and rake. Allowing 10 years for the life of the machines, I've got to write off $290 a year as depreciation. The interest on my investment at five per cent is $145 a year. Repairs will cost me not less than $200 a year. That all adds up to $635 a year, fixed amount, for owning a baler and rake, whether you use them one day or thirty days a year. Now, your average hay crop is about 20 acres, roughly 1200 bales, or less than two full days work. You would have to add $20 for labor and another $15 for gas and oil for those two days; that would bring your total cost to $670 every year, not counting small items of storage, taxes, and insurance, for baling your 1200 bales. That's almost 56 cents a bale; I'm asking you 17 cents."

Adkins is making a fair investment of his money and his time. He hopes to get from 20 to 25 days of baling every season. He will average 15,000 bales in a season, which, at 17 cents a bale, will gross him $2,550. From this he subtracts $635 fixed costs, $200 wages, and $330 power charges for tractor, fuel and oil, a total of $1,165 for a 20-day season. If he hires a man, the wage item will be higher since there will be days during the season when the baler is idle. On rainy days, delays between jobs, during breakdowns, wages go on even though the baler is idle. Adkins' net profit for management and risk figures out to $1,385 per season, a comfortable and happy margin on two machines.

Prevailing Rates

Using the table below as a guide, a farmer should be able to work out equitable rates with his neighbor or local custom operator on almost any farm job. In any particular locality prices may range up or down from the rates indicated here because of local conditions. For example, plowing might be $3.50 an acre in parts of Iowa whereas the price in New York would be $5.00. This is because the New York fields are smaller and more irregular in size and the soil more stubborn. The rates in the table are based on costs and a fair profit and will give both the farmer and the operator a break.

Harvesting

Operation	Unit	Rates
Corn picking	Bushel	$.12-.16
Corn picking	Acre	$5-6.00
Hauling and cribbing corn	Bushel	$ .04
Combining–Oats and wheat	Acre	$4-5.50
Soybeans	Acre	$4-5.00
Field-chopping silage corn, or hay; chopper and blower with:		
1 man, 2 wagons, 1 tractor	Hour	$10-12.00
2 men, 2 wagons, 2 tractors	Hour	$13-14.00
2-4 men, trucks, 2 tractors	Hour	$14-16.00
Silo filling—		
Stationary cutter-blower		
12-foot silo	Foot	$ .75
14-foot silo	Foot	$1.00
Field chopper		
16-foot silo	Foot	$3.75

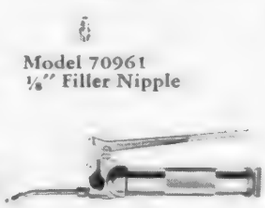
MORE and MORE
Farmers demand ARO
COMPLETE LINE
ARO has the lube-answer for every farm need! Just what you need . . , for faster, better lubrication. Reasonably priced . . . growing popularity! See Your Equipment Dealer. The Aro Equipment Corp., Bryan, Ohio.

"THE HUSKY"—Aro's 10,000 lb. gun. High pressure to crack plugged fittings. One-hand operation. (*Shown above*)

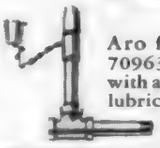
GREASE GUNS and FILLERS

New Model 60032 Farmaster lubricator saves time by delivering more lubricant before recharging. Dispenses from original 25-35 lb. container . . . develops to 6000 lb. pressure. One-hand operation.

Model 2030-F Grease Gun, 1 lb. capacity, low priced, for general farm use.



Model 2643 Grease Gun . . . heavy-duty lubrication.



Aro filler assembly 70963 with nipple used with any hand-operated lubricator . . . extra service as gun filler.

Model 70530 Suction Gun for general use.

Model 60048 Gun Filler, 100 lb. capacity. Loads any hand gun equipped with Aro Filler Nipple.

Complete line of grease fittings. .

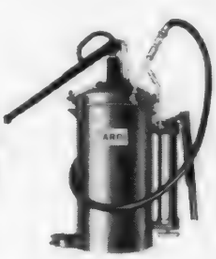
Model 70962 ¼" Filler Nipple

Model 70961 ⅛" Filler Nipple

LUBRICATORS

High-Pressure Hand-Operated Lubricator . . . pump develops to 5,000 lb. pressure . . . Can be refilled with entire 25 lb. container.

Air-Powered High Pressure Lubricator . . . 60 lb. bulk grease capacity . . . will operate off 1 h.p. compressor. Equipped with 10′ H.P. hose.



Double-Duty Lubricator, hand-operated. 30 lb. capacity. Pump develops to 2,000 lb. pressure . . . used as lubricator, or loading hand gun.

ARO

The Leader
IN FARM LUBRICATORS
Manufacturers of Lubricating Equipment for more than 20 years

14-foot silo	Foot	$2.75
Field chopping hay or corn to wagons	Hour	$7-10.00
Shelling corn (under 500 bu.)	Bushel	$ .04
Shelling corn (over 500 bu.)	Bushel	$ .02-.03
Threshing—Wheat	Bushel	$ .07
Wheat (south)	Bushel	$ .12
Oats or barley	Bushel	$ .05
Oats (south)	Bushel	$ .10
Alfalfa and clover seed	Acre	$4-6.00
Alfalfa (California)	Hour	$15.00
Rice (south)	Barrel	$ .60
Barley and wheat (Ariz.)	Acre	$5.00
Cotton picking (machine)	Cwt.	$2.25
Cotton picking (S. W.)	Acre	$3.50
Cotton stripping	Cwt.	$2.00
Harvesting sugar beets, machine, 20-ton yield basis		
California	Ton	$1.50
Colorado	Acre	$20.00
Digging potatoes, machine	Hour	$4.00
Digging potatoes, machine	Acre	$5.50

Soil Working

Operation	Unit	Rates
Plowing, spring	Acre	$4.00
Disk plow	Acre	$3.00
Tandem disk	Acre	$1.50
Harrowing—spike tooth	Acre	$1.00
Cultivating corn—		
Shovel cultivator	Acre	$1.50
Weeder	Acre	$1.00
Stalk cutter	Acre	$2.30
Cultipacker	Acre	$1.50
Bush and bog	Acre	$3.00

Planting

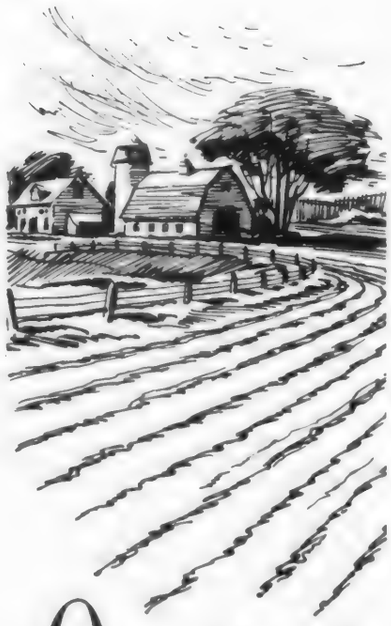
Operation	Unit	Rates
Corn planting—		
Without fertilizer	Acre	$1-1.50
With fertilizer	Acre	$1.50-2
Check row, without fertilizer	Acre	$2.25
Check row, with fertilizer	Acre	$2.50
Drilling, small grain—		
Without fertilizer	Acre	$1.25
With fertilizer	Acre	$1.50
With fertilizer and clover seed	Acre	$1.50
Renovating pastures, disk twice, seed with fertilizer	Acre	$6.00 up
Drilling soybeans	Acre	$1.25
Planting vegetables, cotton, sorghums (west)	Acre	$1.25
Potato planting—		
1-row, operator only	Hour	$2.00
2-row, operator only	Hour	$3.50
Seeding alfalfa, clover, etc.	Acre	$1.25
Airplane seeding alfalfa or small grain	Pound Acre	$ .05 $1.25
Tobacco setting (3 men—Carolinas)	Acre	$5.50

Pest Control

Operation	Unit	Rates
Spraying weeds, material included	Acre	$2-3.00
Spraying corn borer—		
Tractor and material	Acre	$2.50
Aerial (no material)	Acre	$2.00
Spraying potatoes	Acre	$2.00
Dusting potatoes	Acre	$1.50
Spraying fruit trees, no material	Gallon	$ .02
Spraying citrus (Calif.) no material	Gallon	$ .0125
Spraying buildings with DDT	Hour	$3.25
Dusting cotton (South)	Acre	$ .75

Hay Making

Operation	Unit	Rates
Mowing hay	Acre	$1.50
Raking hay (side-delivery)	Acre	$1.00
Pick-up baling, hay or straw—Twine	Ton	$4-5.00
Twine	Bale	$ .12-.14
Wire	Bale	$ .14-.16
3-Wire (Calif.)	Ton	$5.00
Hauling and storing	Bale	$ .07-.10



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And Fairbanks-Morse is the quality name in diesel power. For instance, this rugged Model 49—built to the same exacting standards that have established Fairbanks-Morse as the quality name in diesel engines for over 40 years.

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a name worth remembering when you want the best

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Lightning never has destroyed any building fully protected by Security System. It guards against new perils of metal ducts, piping, etc. Uses most durable materials, all UL approved. Low points, neat, almost invisible.

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Plant your idle acres with trees

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Power Seed and Fertilizer Distributors

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ALTOONA, PA.

Miscellaneous

(Rates include machine, tractor, and operator)

Operation	Unit	Rates
Boring post holes	Hole	$ .10-.20
Manure spreading, loader, 2 spreaders	Hour	$2-3.00
Spreading lime	Ton	$.50-1.00
Spreading mixed fertilizer	Acre	$1-1.50
Airplane, Calif.	100 lb.	$ .85
Applying anhydrous ammonia	Acre	$3.00
Bulldozing (depends on size)	Hour	$8-20.00
Grinding feed—		
Corn (medium)	Cwt.	$ .08
Corn and cobs	Cwt.	$ .08
Cobs	Cwt.	$ .20
Oats	Cwt.	$ .10
Truck (without operator)—		
1 ton or smaller	Mile	$ .15
1 ton or smaller	Hour	$2.50
1½ ton	Mile	$ .22
1½ ton	Hour	$3.00
Sheep dipping	Head	$ .35-.50
Sheep shearing, West	Head	$ .15-.20
East	Head	$ .50-.75
Sawing wood, chain saw	Hour	$3.50-5
Tractors, wheel type—		
(Without man) large	Hour	$1.25
Medium	Hour	$1.00
Small	Hour	$1.00
Spraying buildings with paint	100sq.ft.	$2-3.00

HEAT PUMPS

(*Continued from page* 77)

pumps use water at a rate varying from 600 gallons per hour up to 1800 gallons per hour during the hours they are operating. If the water supply is limited then a U-tube type of circulation of water in the well can be used.

At present the earth is the most widely discussed heat source and it is believed that it may be potentially the most reliable source. Here nature has provided an almost unlimited store of heat at temperature levels which make pumps for heating economically justifiable. Below the frost line the temperatures are fairly constant, between 45° and 56° F., a very suitable temperature for a heat source. However, since the earth holds heat so well, this source is a little harder to tap and, until recent research proved new methods, there had been considerable difficulty in transfering heat away from it.

To Dick Logan, who operates Brookside Farms in Morrow County, Ohio, there is little mystery left to the heat pump's operation. It is simply an electric powered pump which takes water from a well, steals some heat from it, and then pumps it back into another well. By changing a valve or two, it will do just the opposite to cool the house in the summer. It costs less to cool a house than to heat it.

When Logan built his new five-room home in 1947, the heat pump method for heating homes was relatively new. In his neck of the woods there are plenty of zero days in winter, limiting the efficiency of air as a heat source in cold weather, so he settled on water as the source of heat for his 5 hp. pump. Water from the supply well he uses has a constant temperature of 52° F. As it circulates through the heat exchanger tubing, about six degrees of heat flow through the

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A SELF-UNLOADING WAGON NOW

This famous COBEY Spreader plus side extensions gives you that big forage wagon you have been wanting. The chain conveyor (operated from tractor power take-off) does the hard work of unloading — saves you valuable time.

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3 SIZES 150 Bushels 100 Bushels 75 Bushels

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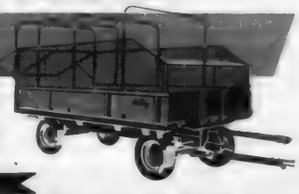
Galion, Ohio

COBEY MODEL 51-A IS A SPECIAL SELF-UNLOADING WAGON



Tractor power operation of conveyor makes quick work of unloading ear corn, chopped hay, and all types of forage crops. All steel . . . heavy screened sides . . . big capacity . . . easy pulling . . . variable speed unloading.

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3¢ spent for postage on a letter to us might very well start you on the road to saving $2,000 — or even more within a year! Savings such as this are not uncommon where farmers have a well-engineered installation of equipment for drying, handling, and storing their crops. And engineering such installations is our business.

Are you putting in a crop-drying system? Are you figuring on additional storage space for corn and small grains? Then drop us a letter. If you have any engineering problems, we'll help you without cost or obligation. And we will send complete information on some of the best crop drying, handling, and storage equipment you have ever seen. Remember 3¢ spent now may save you not only money — but future headaches as well.

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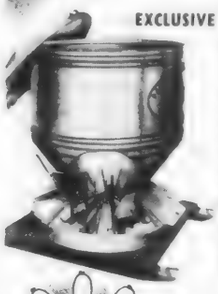

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HOG FOUNTAINS never freeze. Heaters (choice of oil or electric), operate for 3c to 4c per day at zero. Have 85 gal. galvanized inner tank, automatic float valve, 2 or 4 troughs.

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Everything you need to know about maintaining and improving health and value of your Cattle, Sheep, Goats, Swine, Horses, Mules. How to use latest Drugs, Antibiotics, Vitamins, Disinfectants and Insecticides for best, most economical results. Prevention and treatment of every Disease, Parasite and Common Injury. 624 big double-column pages. Over 300 illustrations. Only $7.50.

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copper tubing into the much colder Freon refrigerant. The 46° water is then exhausted into a second well. The warmed Freon gas with its load of heat then is carried to the compressor where the temperature is raised to 120° F. by compression. A fan circulates air from the house over the large condenser coils. Because this air is colder than the compressed refrigerant, it picks up the heat and distributes it through the conventional hot air ducts to the various rooms.

Logan's heat pump has now been in operation five seasons. During that time temperatures as low as 20 below zero have hit Morrow County and the unit has produced plenty of heat for the house.

Since the Logans bought their equipment wholesale and assembled it themselves, they figure that the unit cost about $1400. During the 1948-1949 season a separate meter on the heat pump showed that 6,168 kwh. were used. With electricity at 1¾ cents per kwh., heating for the year cost $107.94. In 1951, the bill went up to $136 and in 1952 the cost was about $132.

Who Makes Package Units?

At the present time there are five or more manufacturers who make package units:

1.) Comfortaire Heat Pump, water-to-air. American Coils Company, Newark, New Jersey. (A subsidiary of the Brunner Mfg. Co.)

2.) Flow Temp Heat Pump, water-to-air, by Acme Industries, Jackson, Mich.

3.) General Electric Heat Pump, air-to-air, made by General Electric Company, Bloomfield, New Jersey.

4.) Marvair Heat Pump, water-to-air, Muncie Gear Works, Muncie, Indiana.

5.) Prop-R-Temp Heat Pump, water-to-air, made by the Typhoon Prop-R-Temp Corporation, Tampa, Florida.

The Westinghouse Corporation is entering the field soon with its newly developed package unit.

The package units now available use either water or air as the heat source. Heat pumps using coils or pipes buried in the earth are not available in packaged units yet, although some of the water-to-air units can be adapted for use with the ground coil, but a number of tailor-made installations of this kind have been made throughout the country. Design data for this type unit is not yet complete, but work at Kansas City College indicates that for Kansas conditions it will take about 200 feet of 1⅛ inch pipe for each motor horse-power on the heat pump compressor. If ¾ inch pipe were used, a slightly greater length might be needed. Thus a 3 hp. heat pump would require 600 to 800 feet of pipe buried 4½ to 5 feet.

How Much Do They Cost?

A 3 hp. unit will heat and cool a small, well-insulated house in an average climate, but a medium size house may take

IS COLLOIDAL PHOSPHATE SUPERIOR TO CHEMICALS?

IN A CAREFUL GROWING TEST, John Bunting, Danforth, Ill., found that Colloidal Phosphate produced an **11% bigger yield of corn at 35% lower cost** than his favorite chemical fertilizer! This is a typical experience of farmers the country over, for Colloidal Phosphate brings better results in practically any soil or climate. **Action is immediate,** for minerals are in the digestible form plants require . . . ready to enter directly into cellular structures and produce stronger, faster plant growth. **A real soil builder!**

ADD MARLAND (greensand marl, rich in potassium and many trace elements) for even better growing results. It loosens and opens hard soils, binds sandy soils, regulates moisture and stimulates soil organisms.

FREE BOOKLET describes Hoover Soil Conditioners . . . including Soil-Nu, the amazing product with volcanic ash base. Write today. **Dealer inquiries also invited.**

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Gilman, Illinois

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Riding equipment for farm use, pleasure and show. English and Western saddles, bits, bridles, spurs. Stable blankets. Girths, Caveson sets. Other horse equipment.

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Ever since 1901, Boyt has been making the strongest work harness in America. Also available are horse collars, body belts, tarpaulins, hunting and fishing equipment, and many other items of particular interest to the farmer and sportsman.

FREE CATALOG — Leading harness, hardware and implement dealers feature Boyt items. For free catalog, write The Boyt Co., Dept. L, Des Moines, Iowa.

a 5 hp. unit. As the size unit increases the cost increases. Average cost of an installation starts at about $3000 for a 3 hp. unit and $3500 for a 5 hp. unit. A 7½ hp. heat pump may run as high as $5000, while a big 10 hp. pump may cost $6500.

The cost of the unit also increases as the cost of finding a suitable heat source increases. For example, if a suitable well is not available for a water-to-air unit, the cost of drilling a well must be added. If the ground-to-air unit is used, an extra $1000 may be spent for buried pipe.

Although a heat pump could be installed in conjunction with a radiant heating system or could have convectors or radiators in each room, most of the package units now on the market use the forced warm air method.

Admittedly, the cost of the heat pump is high, especially when we consider that a good furnace sized to heat a large house will cost half the price. There may also be the expense of developing a suitable heat source, or of providing supplemental heating equipment in some areas of the country. In addition, a house must be fairly well insulated if it is to make efficient use of the heat the pump provides.

But champions of the heat pump, while acknowledging these facts, retaliate by pointing out that the heat pump is both a heating *and* a cooling unit and that with greater quantity production, the cost of the heat pump installation will probably be less than the total cost for the two separate installations. The machine maintains an even temperature automatically, winter and summer, with no stoking, refueling, ash hauling, or wood cutting. Electricity is the only utility needed and offers the possibility of an all-electric home as well as doing away with the soot, grime, and odors which are part of heating with conventional fuels. Since no fire is used, no chimney is needed, which would save several hundred dollars in a new home.

Once installed, the heat pump can be made to operate relatively economically. The best way to evaluate the cost of operation is to compare it with the cost of heating by other methods with which we are more familiar. We speak of the "efficiency" of a furnace, but efficiency in the ordinary sense has very little meaning in connection with this newer machine. Instead, we refer to the "coefficient of performance" (C.O.P.) of a heat pump.

We can safely assume that a heat pump using well water will have a C. O. P. of three or more. Now to compare the costs of heating with an electrically driven heat pump and conventional fuels.

A heat pump with a C. O. P. of three using electricity at 1½ cents per kwh.—or a pump with a C. O. P. of four using electricity at 2 cents per kwh.—will deliver a million Btu. for about $1.50.

A fuel oil furnace using 15 cents per gallon fuel (140,000 Btu. per gallon, 70 per cent efficiency) will produce a million

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COW COMFORT DESIGN is this NEW
NEY-AGRA
TRADE MARK
THE FIRST RUBBER COVERED LOOP PADDLE
9 WAYS BETTER
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check completed cost before you build a

machine shed

● The price on a material list may look low, but don't let this fool you—it's only part of the total cost of your finished building. Labor is a big item, too . . . and cutting and fitting is slow, expensive work. That's one reason why you get more for your money building with Rilco glued-laminated wood rafters. They're precision cut and drilled at the factory . . . go up so easily you can frame a big machine shed in less than a day.

Besides saving you money on erection costs, the Rilco machine shed is engineered for lasting, trouble-free service. It withstands enormous wind and snow loads . . . it has no posts or braces to waste space . . . is easily converted for use as cattle shed, barn or storage building. Its sleek, modern lines will improve the appearance of your farm.

Ask your lumber dealer about versatile utility buildings made with Rilco glued-laminated wood rafters . . . he'll show you why the *finished cost* is lower than on any comparable permanent type of building.

RILCO *Laminated* **PRODUCTS, INC.**
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This Rilco Utility Building is constructed with laminated wood rafters that run from foundation to ridge—no posts or braces are needed. Rafters are made of kiln-dried Douglas Fir, permanently bonded with glue that's absolutely waterproof.

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Radiator Enclosures

Turn unsightly radiators into points of decorative interest . . . and eliminate the annoying smudge that so quickly soils clean walls and draperies. Even more, Gardner enclosures — equipped with special non-mechanical water pans — keep rooms more comfortably, economically heated by directing warmed, moist air out into the LIVING ZONE. Send for an illustrated folder on these custom-made enclosures.

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Abundant, Healthful Humidity

Btu. for $1.53.

A natural gas furnace with gas at 40 cents per 1000 cubic feet (1,000 Btu. per foot, 80 per cent efficiency) will produce a million Btu. for 50 cents.

A liquified petroleum gas furnace with 15 cents per gallon gas (100,000 Btu. per gallon, 80 per cent efficiency) will deliver the same amount of heat for $1.87.

A stoker coal furnace with coal at $15 per ton (12,000 Btu. per pound, 65 per cent efficiency) will produce this amount of heat for 96 cents.

It may be seen, then, that anywhere that electrical power can be had for two cents per kwh. or less, the heat pump can be competitive with several of the conventional fuels. The stumbling block of using it is the initial investment required.

Farm Home Installations

Darrel Dunn, who farms two sections in the wheat-milo-cattle country near Langdon, Kansas, has installed a 7½ hp. heat pump in his big 10-room farm home, which has a half basement and an attic. Although a house this size would be a problem to heat by any method. Dunn has no complaints about the way the heat pump operates.

Water, which acts as the heat source for the Dunn's unit, is piped about 200 feet from an existing well. The water is not wasted after it is used by the pump, but is routed to the lawn and garden when needed in the summer or to an old dug well in the winter. The only water problem the Dunns had was in disposing of moisture condensing out of the humid summer air before a sump pump was installed in the basement with the heat pump system. This condensate was being caught in a five gallon pail at first. On very humid days the pail filled several times daily.

The initial cost of this heat pump unit was $3000. Dunn estimates that the cost of heating with it in the four years he has had it has been about 15 per cent less than the cost of heating with fuel oil. It has also been possible to heat the house adequately for the first time. In the 1950-51 season, total kwh. consumption for both heating and cooling was about 17,000. In 1951-52, this increased to about 19,000 kwh. The increase was caused by a more severe winter, Dunn says, not by any change in the heating.

More Farm Uses

The heat pump may eventually do more for the farmer than heat his home. Another possible application is that of heating water. Although heating water directly with electricity is common and generally considered a practical method, the heat pump will do the same heating for only a half to a fourth of the cost if a satisfactory heat source is available.

Some dairy farms are using the milk cooler refrigeration system for heating water or heating the milkhouse at the same time that milk is being cooled. In this

Prevent costly Winter freeze-ups

G-E HEATING CABLE SETS PROTECT PIPES AND ROOFS AGAINST WINTER DAMAGE

You can prevent pipes, valves, and pumps from freezing and bursting this winter, by protecting them with G-E lead-covered heating cable sets. Wrap the cables around exposed plumbing to help assure a steady water supply for barns, poultry houses, and residences. Heating cable sets have many other winter uses, too:

Prevent roof leaks caused by ice dams at the eaves that force water up under the roofing to damage ceilings, walls, and furnishings. Heating cable sets keep eaves, troughs, and downspouts clear for as little as one cent an hour.

Keep watering troughs from freezing. Line them with waterproof heating cable sets to keep the water at drinking temperature.

Keep floors warm in loafing barns, kennels, and poultry houses, and as a heat source for brooders. Lay the cable right in the concrete.

Keep feed additives fluid. Heating cable sets, wrapped around drums of honey or molasses, will keep it flowing easily.

WARM-WEATHER USES GIVE DOUBLE VALUE

And next spring, use your heating cable sets to speed seed germination and seedling growth, by burying cable in the soil of hot beds, cold frames, and greenhouses. They'll help you get to market early—in plenty of time for top-price selling. Ask your hardware or farm equipment dealer for G-E heating cable sets, or write for further information to Section D101-930, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

You can put your confidence in—

GENERAL ELECTRIC

case the warm milk is the source of heat and the heat which would normally be removed from the milk and wasted in the surrounding air is used for heating water. The initial cost of such a system to heat water or the milkhouse, as with the house-heating system, would probably be greater than the cost of the refrigeration system and an independent hot water heater, but in a short time the extra amount could be saved through reduced operating costs. The additional cost of equipment to adapt a wet box type milk cooler to milk house warming is about $300.

There also seems to be a promising application of the heat pump in the grain drying field, and in temperature and humidity control in vegetable storage.

Even with these possible applications, mass space heating of homes is the ultimate target of the heat pump makers and the electric utilities. Again making their favorite comparison with the electric refrigerator and the length of time it took this appliance to become fully developed and within easy range of the home owner, their engineers and prognosticators figure that it will be 1960 before the machine is in steady demand.

THE DEPENDABLE HYBRIDS

(*Continued from page* 40)

first two weeks, gave it three cultivations, and had it cultivated for the first time before the Fourth. It's modern machinery and the good hybrid seed that has made this kind of corn-growing possible."

Tebbe, like many Midwest corn men, has found out that fertilizer is one of his best money-makers. He makes no special point of the fact that he uses over 1000 pounds of fertilizer an acre during his three-year rotation.

"We try out most of the new hybrids, but take a look at those half-mile rows of dark green corn back there," he says, with a wave back of the barn. "That's a commercial seed, Pioneer 350D, and it seems to be one of our best corns in a dry year. It picks well, too. Some people talk about corn running land down. It will—any crop will, if you don't put more back in the soil than you take out. But we think corn has been our best crop for making money and for building up the soil. This spring I was able to buy two new Massey-Harris combines for $11,600. That is just what my first 80 acres cost me in 1937."

What Is Hybrid Corn?

Corn is an All-American crop. Inherited from the American Indians, it has been the crop that has made us a strong, well-fed people. Because corn is so important to so many people, it is worth noting a few of the points that are back of our present day bountiful corn crops. Our early colonists along the Eastern seaboard soon learned to use and depend on the Indian's maize. But it was not until the great movement of settlers began in the early 1800's, to the fertile valleys and

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plains along the Ohio, Mississippi, and Missouri Rivers that corn-raising caught hold. Corn was the prize, and the Black Hawks, the Sac, and Fox tribes were defeated with rifles, treaties, and a by-product of their own harvests — corn whiskey.

By breaking new land, we were able to raise our corn production to three billion bushels in 1912. By that time, our first experiments had begun with hybrid corn. Edward M. East, at the Connecticut Experiment Station, had published his paper on hybrid corn, "The Improvement of Corn in Connecticut," and Davenport, Hopkins, Shull, and Jones were hot on the trail that led to the commercial work of Henry Wallace in the early 20's.

One of the reasons for the high-speed development of the hybrid corn business was that American breeders discovered the secret of how corn reproduced itself. The Indians in thousands of years of work with maize never seemed to understand this. In the pollination of corn, we see nature at her meticulous best. Corn plants have both the male and female cells on the same plant. In the hot evenings of July, the light filters through the floating yellow pollen and the air is heavy with its musk-like odor. From the tassel at the top of the stalk, the airy pollen floats down to the silks on the ear shoots, halfway down the stalk. Growth starts at once: from the pollen grain a tiny tube springs to life, traveling down through the corn silk until it reaches the female cell on the cob. Within a matter of minutes, a kernel of corn starts to grow. Since there are as many as 1000 silks to an ear, each one may become the bridge for life creation.

Just as the dairy cattle breeder searches for the cows and bulls which can transmit to their offspring the best milking ability and stamina, then having found the particular animals, maintains them as the parent stock for his herd, so the hybrid corn breeder is looking constantly for the best yield, disease resistance, and ripening and husking characteristics in his parent stock. These parents are one of the old-fashioned open-pollinated types of corn. Once having found these qualities and other desirable characteristics, he has learned he can strengthen them with mathematical precision and with much greater control than can a breeder of animals. To do this he inbreeds by self-fertilization, using the ability of the corn to produce both male and female cells. After he has purified his corn plant and has just the right qualities, he will use this "inbred" as parent stock. It is two of these inbreds that are crossed, making use of the shot in the arm which we know as "hybrid vigor" that comes from crossing unrelated animals or plants. It is the first generation seed, the hybrid that

comes from this mating, that the farmer plants. Working with tremendous numbers of plants, the breeder has endless variations of good and bad qualities to tinker with; in the end if he comes up with one good hybrid possibility out of 1000 tries, he considers himself lucky.

Picking a Hybrid

Experiment Stations in most states can recommend hybirds that will do well in various areas of the state. Commercial seed companies conduct hundreds of replicated yield tests each year. The recommendations are based on performance data of these hybrids in the areas for which they are being recommended. Usually several choices are given for each maturity class, and if winter crops are to follow the corn crop, shorter maturing corn is recommended. Maturity classes vary in different states, but in the corn belt, the range is about 30 days from the earliest ripening to the latest hybrids. In the early days of hybrids, the difference between the yield of early and late corn was greater than now. Breeders are getting earliness as well as high yield in much of the corn. Another way to find out about new hybrids is to see how they perform for your neighbors.

The best bargain in seed corn is good seed. The best seed costs not more than 50 cents more per acre than "bargain seed." It is no trick at all to get several bushels more yield with the same effort, the same plowing, the same rainfall, the same growing conditions, the same fertilizer—if the seed is the right one for your fields. In Southern Ohio, Ralph Tarkle has taken all the information he could get from the hybrid corn companies and the Extension Service, then put in his own test plots.

Tarkle says, "I plant 1/70th of the acre. That makes it easy to figure the yield in bushels per acre. Some smart fellow with a slide rule has figured out that if you plant or pick 1/70th of an acre and get the weight of ear corn in *pounds,* this will be the same figure as the *bushels* per acre yield. To figure 1/70th of an acre use these figures:

Row spacing for drilled corn	*Distance to use to plant or pick 1/70th of an acre*
3 ft.	207 ft. 6 in.
3 ft. 2 in.	196 ft. 6 in.
3 ft. 4 in.	186 ft. 6 in.
3 ft. 6 in.	177 ft. 9 in.

"I believe the Extension Service boys then convert all their different types of corn to a shelling percentage of 80, No. 2 corn with a moisture content of 15.5 percent, but the figure I get is good enough for me to base my planting on. I found a variation of up to 15 bushels yield between several recommended hybrids and I planted them all side by side, on the same day, with the same planter. Unless some fellow held an umbrella over his rival's corn, they all got the same rain and sun!

"What I want in a corn is a good high yield, of course, but I'll take a little less of that if the stalks will just stand up in the fall winds and rains until it's ripe. Then I want a medium size ear that will snap well when I put the picker through the rows. It's got to stand up and fight back against blight and insects. These are the things I look for in the hybrids I test every year. We've got a pretty long season here so I can take a full growing season corn—say a 100 to 120 day hybrid."

Mixing Maturities

One of the ways of making sure that all corn is pollinated is to plant hybrid corn of several maturies together. Some corn growers do this by mixing the same grades of several maturies together in the corn planter. Others plant alternate rows of different maturing hybrids. The effect is the same. During the time that the silks are at the right stage for pollination, there is always some pollen descending on

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them from the tassels of different maturing types of hybrids. By mixing hybrids of different maturities, the pollinating season can be increased from two or three days to two weeks. Some Midwest farmers claim this has helped them boost corn yields by producing better filled ears.

Most of the hybrid seed corn being sold is graded into six basic sizes of kernels which are: large, medium, and small flats; large, medium, and small rounds. The old superstition was that the corn plants would produce the ears having kernels of the type that was planted. Of course, the large flats are nicest to hold in the hand, but they are also the most expensive. Tests have shown that small rounds will produce just as good corn as the more expensive large flats, for all kernels from a hybrid seed ear carry the same germ plasm. The important thing is to be sure that the planter plates fit whatever grade is to be planted, so that there are no skips. The plate should have cells that hold only one kernel at a time. If the plate breaks kernels, those kernels won't germinate. Small rounds are a good buy every year if you are willing to get the plates recommended for them. Most of the hybrid producers specify plates on seed tags.

Here is one college's advice on maturity types of corn: "Corn is considered to be mature when the ear moisture content is down to about 40 percent before killing frosts occur. Ear corn is safe to crib when the moisture content is below 25 percent. Most local elevators or corn buyers have moisture testing equipment with which they will be glad to test your corn.

"A late hybrid with good grain yields is good for silage. The later hybrids generally produce more fodder and yield more silage per acre. Corn for silage should reach the early dent stage well before frost in the average year. The early dent stage (soft to medium dough) when almost all the kernels have dented is the best time to begin cutting for silage.

"The earliest hybrids should be chosen for a year when you have to plant late, for sandy soils of low productivity, muck soils, and for corn which is to be followed by a winter grain or cover crop. Another use for early corn is to help out with the feeding in September. If a farmer sees that he is going to run out of corn he can put in a small acreage of early corn and have it ready to feed by September. Even

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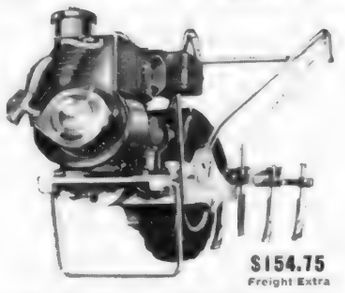

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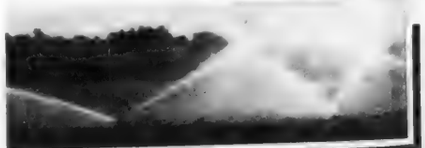

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though the yield is slightly lower, it will usually pay off, for it saves going out and trying to buy old corn.

"If you plant large corn acreage some degree of 'crop insurance' is possible by planting two or three hybrids that differ slightly in their maturity. If one hybrid runs into unfavorable weather at a critical stage in its development, the other hybrid may be less affected and come through with a good crop."

One of the questions that farmers ask is, "Should I plant hybrid seed that is grown in my own part of the state?" Seed experts say that seed having been grown in the same state in which it is to be planted does not improve or lessen the producing qualities of a hybrid. Just as any shape kernel can produce high-yielding corn as long as it has the right parents, so seed from Illinois can do a wonderful job in Georgia, if it is suited to the growing conditions of the area and has been tested there over a period of several years. And a hybrid grown in the same county can likewise be a top-producer.

High Protein Corn

Seed breeders have experimented with the idea of breeding a hybrid corn that had a higher protein percentage. Some hybrids have been developed that will actually produce a higher protein content. Often, however, this higher protein percentage is coupled with other less desirable growing and harvesting qualities. Like other hybrids, those that are specifically known to carry a higher protein should be tested alongside the hybrid usually planted to see how they compare under farm conditions. Another method of producing higher protein corn is to give the corn extra nitrogen. A. W. Klemme of the University of Missouri found out with test plot planting that 80 pounds of nitrogen on the corn crop, using several kinds of N-carrying fertilizers, in addition to phosphorus and potash, raised the crude protein content of the corn from 8½ to 9½ percent. This extra protein produced by an acre of 9½ percent corn figures out to equal the protein feeding value of about 350 pounds of soybean meal.

In the early days, when there was still a certain amount of mystery connected with hybrid corn seed, there were all kinds of selling rackets, and since it took the farmer four months to find out that he had been "taken", there was not much he could do about it—except to be more careful where he bought his seed next year. The racket worked most often was for a traveling salesman to pick out the finest looking flat kernels from a high producing hybrid corn field and bag them up. Then he could say with a perfectly straight face, "This seed came from a field over in the next county that did 100 bushels to the acre." He was right; the hitch was that the second generation hybrid would yield about 25 percent less than its parents.

Today, after thousands of corn-belt farmers have proven for themselves what the dependable hybrids can do on their own farms, there is little chance of seed rackets getting started. State seed inspectors test all hybrids sold in their state for germination, impurities, and the source of the seed. Certified seed associations maintain a close control over the seed production and sale in their own states. In many states, registration is required for all seed dealers. The seed is all set for a big corn yield. What the farmer does with it, and what the weather does for it, makes the difference between a corn champ and an also-ran.

TEXAS (*Continued from page* 39)

I know of some of the boys who are trying to reseed the range with red panicgrass and crested wheatgrass. The best management I know is rest and rain."

The Waggoner Ranch

Some 70 miles to the east of Pitchfork is the Waggoner DDD ranch (the D is reversed in the brand) about which a wag once said. "They ranch the way it should be done—one oil well for each cow." And it's true that the smell of oil seems to hang over the new ranch office building on Deaf Smith Street in

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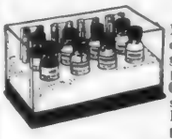

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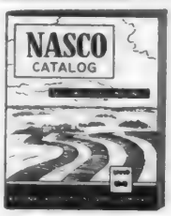

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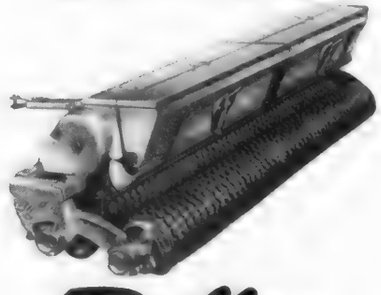

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Vernon with its black and gold Italian marble halls and escalators to the second floor, its elegant offices, and luxurious pent house for guests—complete with rooftop lawn and shrubbery. The influence of oil can be felt, too, around the Zacaweista and Santa Rosa ranch headquarters from which the half million acre spread is run. Here the polo field, dog kennels, air strips, and guest houses are floated on black gold, but beyond these rich islands the ranch is a working outfit.

Like most cowboys, the DDD men are out of bed by four in the morning and at the chuck wagon to eat breakfast and get in the saddle by five. As one of the men put it, "Twenty-four hours of my day is Waggoner's; the rest of the time I'm on my own."

When the chuck wagon is not too far out, some of the sons of the cowboys ride out to eat lunch with their fathers. One such summer day about the time the cook was ready to give away to exasperation from trying to keep a good lunch hot, the kids spotted the men riding in, slow running their horses, stopping at one of the horseshoe-shaped water tanks to let the horses drink, unsaddling and loosing their horses near the chuck wagon.

When they came in, their faces were dusted a brick red beneath their hat bands. Even after they washed, there was a sharp line between their pale foreheads and sunburned faces. The men and boys filed past the end-gate of the chuck wagon with their tin plates, loading on hominy, potatoes, pork and beans, ham and sourdough. They squatted on the ground to eat or leaned against the wagon. The last man in was G. L. Procter, the wagon boss, called "The Kid" because of his slim, young look. He ate first and washed later—then joined a group who had a deck of cards and a gunny sack full of poker chips. The other men lounged around on the ground under the canvas.

"This friend of mine, Rusty," one said, "has got himself a ranch with a lot of oil on it. He told me that he's tried goff and po-lo and every game except girl's hockey and he wouldn't trade the lot of them for steer roping. And that boy is good! I've seen Rusty rope one and be on the ground waiting for it to come down. Toots Mansfield couldn't have done better.

"I was riding a silly, old horse—you could have put a bale of Kansas hay in his head without filling it up. Then this old hound dog that carries his tail up over his back walked under the horse. The horse flinched and jumped and I split the ground."

The cowboys seemed curiously divided into the men over 40 and youngsters in their teens and early 20's "The boys who went into the army and got a taste of soft life never came back to cowboying," one old timer believes.

Most of the older men have put in time with several of the big ranches, working as long as it was congenial or until they had a stake, then throwing their saddle chaps, extra boots, and bed roll into their jalopy and moving on. These tools of their trade are usually selected with great care. Boots and saddle are almost always hand made, costing from $30 to $50 for boots

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and $175 to $250 for the saddle. Chaps are either bat-wing or shot-gun. The bat-wing have a wide flapping wing and are liked because they snap on, and disliked because they flap in the wind and frighten the horse. The shot-gun type are solid tubes which give better protection, but are impossible to get on and off over a pair of spurs.

One of the men, who had been sharpening his pocket knife on the chap leg of a sleeping cowboy, looked down the draw, then woke everyone with his shout, "Here comes the remuda."

Toward the wagon came the 250 Quarter horses which go with the chuck wagon and are called the remuda. As they came up they were joined by the horses which had been ridden that morning, the saddle-sweat marks still showing on their short-coupled, muscular backs. They were driven into a corral made of lariats tied together and fastened to mesquite shrubs. Proctor and one of the top cowboys, Frank Hanley, went into the single rope corral with the circling horses and started roping them, while the other cowboys stood on the outside calling in the names of the horses they wanted—Doughboy, Toothpick, Regina, Lizard Head, Rag Mop, Crazy Quilt, Handy Mandy, King Pin, Sun Down Dan, Tar Baby, Rabbit. With no more identification and without fuss or wind-up, the men whipped the loops of their ropes out over the heads of the running animals—then they would walk up quietly to the roped horse, settle the noose high up on his neck, and lead him to the cowboy who called for him.

Each cowboy is assigned a mount of 12 to 15 horses which are his to break and to ride. He will have horses ranging from newly broken three-year-olds to trained roping horses; he chooses his mount according to the work to be done.

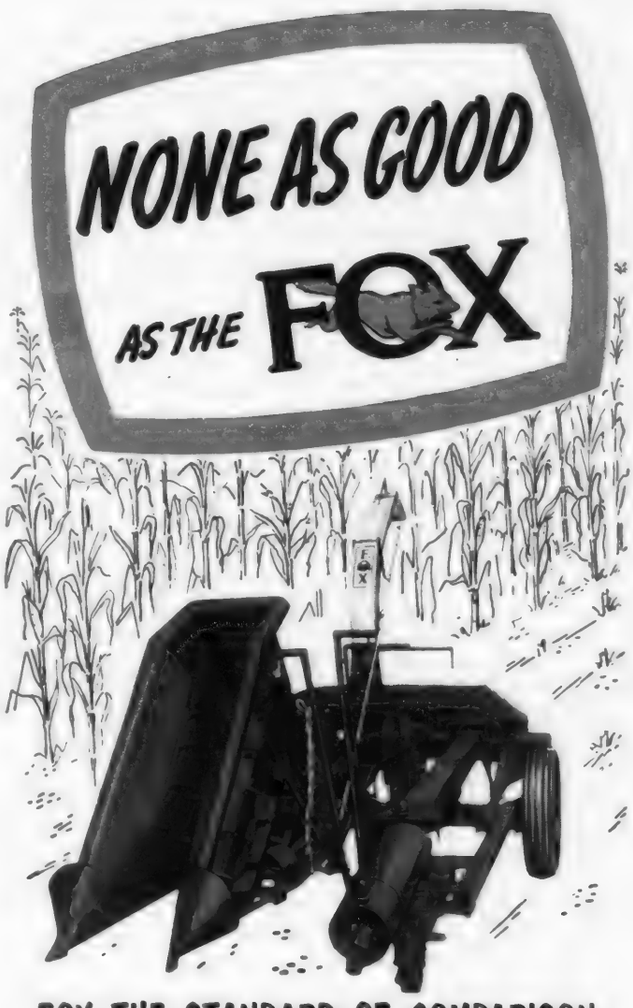
As they received their horses, the men led them out into the open and saddled them. Two new men, a 15-year old youngster and a seasoned cowboy, had called for their youngest horses and were having difficulty saddling them. The old man, Dan Blackwell, who had just joined Waggoner, worked a loop from the lead rope behind the near hind hoof of his horse and pulled it off the ground to make a Scotch hobble. The youngster, Bobby Hatfield, succeeded in saddling his horse, Crazy Quilt, but when he boarded him he was greeted with a series of humping, twisting, stiff-legged bucks. He rode the horse for a half dozen jumps, the men shouting, "Ride him, boy, ride him!" But when he lost a stirrup, they yelled, "Roll off him Bobby," and he and the horse parted company. Later, when the horse had been caught and Bobby was again in the saddle, one of the men rode along beside him, "You've got him between the shafts now, boy. That old son-of-a-bitch can't throw us again."

As they rode off across the range, 21 abreast, with the men on the rambunctious horses allowing them to run out to the side in great looping turns, it was easy to see why men would spend their lives working for $125 a month and never be tempted away by factory or city life.

Though the cowboy, with his helper, the pilot of the Bell Helicopter, ranges over most of the DDD ranch, there are 27,000 acres of it under cultivation. One giant field of wheat, The Big Field, covers 15,000 acres and is harvested by 14 self-propelled combines. In late May, the great red machines open up the field and start blowing chaff. For days they follow each other, each machine stepping into the field one swath further than the one ahead of it. As soon as the combines, which are custom operated, are off, the Waggoner's crawler tractors move onto the fields pulling five 20-ft disk plows.

Joe Bridwell's Hereford Ranch

One of the ranches which supply the Waggoners with bulls is 40 miles further east; it has a little more rain and its range is a little greener—though this year Joe Bridwell, the owner, and his ranch manager, Bud Thurber, are deeply concerned about the drouth. This ranch and the other Bridwell ranches scattered across Texas and Mississippi — a set-up that keeps Bridwell's twin-engined Beechcraft in the air nearly every day—comprise over a quarter of a million acres. Bridwell arrived in this part of Texas about 40 years ago when he missed a train from Dallas to Stamford. Instead of waiting, he took the next train out, which



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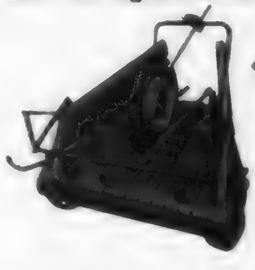

The Hay Harvesting Unit, like the other two units, can be changed to mower bar or corn silage harvester in less than 10 minutes by one man without tools.

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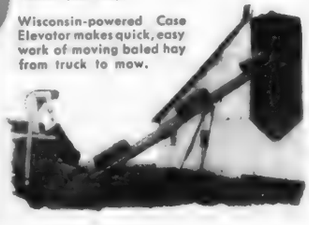
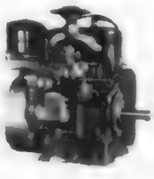


Single-cylinder 3 to 9 hp.



2-cylinder 7 to 14½ hp.

V-type 4-cylinder 15 to 36 hp.

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brought him to Wichita Falls. For a man of his unlimited energy and gumption, Wichita Falls looked like the place to make a fortune in oil, and Bridwell did it.

The original Larry Domino, the great bull, whose sons, grandsons, and great grandsons are constantly making news with the fabulous prices they bring, was raised here on the Bridwell purebred ranch. And so was Larry Domino 50, the highest register of merit bull in the Hereford breed, which was sold to Allen Feeney of Milky Way Hereford Farm. The current major attraction at Bridwell's is Larry Domino 107, a son of Larry Domino 50; he cost the Bridwell ranch $80,000 for a half interest.

Although worth that kind of money, Larry Domino 107 is far from being lonely or even far out of his class on the Bridwell ranch. The owners are naturally anxious to find some better way to employ him than letting him run with twenty cows. Bridwell's answer has been to use artificial insemination. In this way he is able to breed 150 head of cows during the six months of the year he has the bull, which is about four times what can be done with the hand breeding system he uses with some of the other bulls, such as Larry Domino 30 and his great Larry Mixer Domino—a bull which is producing as good or better calves than 107.

Whether hand breeding or artificial insemination is used, it means catching the cow and bringing her in when she is in heat. Any dairyman who has tried to keep tab on his dairy cows which are confined in a small paddock and milked twice a day will appreciate the magnitude of the job of trying to watch for heat signs in cows in a 3,000 acre pasture. The Bridwell cowboys at the Purebred Ranch ride the range all day long trying to see each unbred animal in the cow herd at least twice a day. With around 1500 head of cows in the herd, the job is fantastic. To help out the cowboys, they have turned in some steers which were not castrated until late in life—their masculine reactions help single out the right cows.

When these range-raised purebreds have been caught they are brought into headquarters and either turned in with one of the bulls or put into a cattle squeeze to be bred artificially by Dr. Ray Hander, the ranch veterinarian. Dr. Hander's figures show that they are getting better than 80 per cent impregnation.

Dr. Hander, who looks more like a cowboy fooling with a microscope than a scientist, was voted the outstanding practitioner of Texas for 1952 by the members of the Southwestern Veterinarian Association. He is in charge of the livestock health problems of all of the ranches. He is also carrying on research which he and Bridwell hope will throw some light on the causes of sterility in cows. One task relating to both practical ranch management and his scientific research is the

testing of the commercial herd of range cows to check on their pregnancy.

The mother cow herd, wild and rugged from the range, is corralled and the cows are run down a chute ending in a cattle squeeze where they can be held while Dr. Hander, one arm covered with a shoulder-length rubber glove, makes a rectal examination to determine if the uterus has gone over the pelvis into the body cavity, and whether the uterine artery is enlarged and has developed a strong pulse and whether the ovaries have slipped down—all signs of pregnancy. In actual practice, this examination has all the aspects of a wild animal act. The mother cows come down the chute and hit the tubular steel squeeze with a pipe-rattling smash and, more often than not, try to go through the head stall or over the top of the apparatus. Dr. Hander, working the cows as they try to escape the squeeze, talks to them constantly, "Come on, mama, get your head in there. Come on, mother! (She goes up on her rear legs trying to go over the top.) Bust her across the ears, Jack. (She comes down and jams her head into the stall.) That's a good girl, mother, let's see if you have a calf." For all their struggles, he gets through 30 or more in an hour.

The J. B. ranch manager, Bud Thurber, a muscular 33-year-old Arizonian who was raised on his father's 17,000 acre ranch near Sonoita, Arizona, took to cowboying as a boy, and has a pair of shotgun chaps whose insides are peppered with broken-off cactus thorns to prove it, but decided that a degree from an agricultural college would do him more good than a pair of pony-bowed legs. He has done extensive range seeding in a program of range improvement. Standing in one of his seeded pastures, he said, "We put in little bluestem, and King Ranch bluestem, and Johnson grass here; and last year had a stand that was way above my knees. Now look at it," he said, pointing to the brown thirsty range, "It takes rain to make seeds germinate and grass grow.

"You know, the greatest improvement on the range is the cattle. I can remember when I was a boy we had three- and four-year-old steers weighing less than a thousand pounds; now Pitchfork and Matador and the other commercial breeders are producing fifteen hundred pound two-year-olds. That's the kind of improvement

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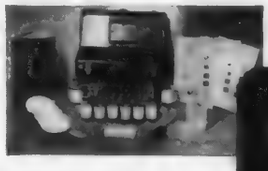

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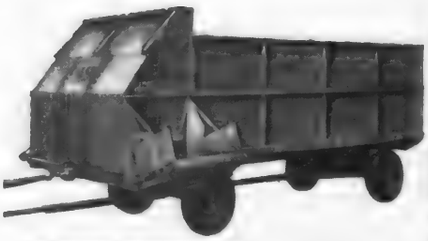

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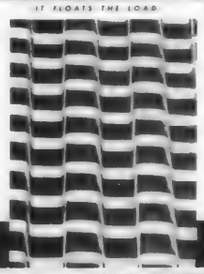

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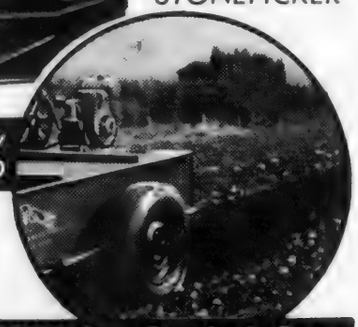

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in breeding that makes good bulls worth the dough."

Bridwell is enormously concerned over the soil that is stolen by the wind or washed away by the rains. Each year he gives the $5,000 Bridwell Soil Awards to farmers who have done the best job of soil conservation in Wichita, Archer, and Clay Counties. "America is growing at the rate of around seven thousand people a day," he said, "and, by George, we aren't even holding onto the soil we've got, let alone increase our productive capacity to meet the future. Isn't that right? Huh? We'd better wake up here."

The King Ranch

Far to the south, near the Gulf of Mexico, is the largest of all of the Texas ranches, the King Ranch. Founded by Captain Richard King in 1853, it now covers 950,000 acres in Texas and has divisions in Kentucky and Pennsylvania and operations in partnership with others in Cuba and Australia. The home ranch has 1,500 miles of woven wire fence reinforced, as an experiment, with elephant ear cactus; 700 miles of improved road, much of which has an eight-foot center paving of asphalt; 347 windmills and 97 artesian wells, so that no animals are more than a mile and a half from water anywhere on the ranch; 740 employees, most of whom are second or third generation King Ranch people of Mexican descent; and three public schools for the workers' children, and a school for jockeys, run by Max Hirsch, who trains the King Ranch race horses. Hirsch has trained two Kentucky Derby winners for the Ranch, both of which were ridden by graduates of the jockey school.

The size of the King operation permits them to make innovations to fit their particular needs. Probably the best known King development is the Santa Gertrudis, a breed of beef cattle created for this part of the country and since found to do well under greatly different conditions here and abroad. The King Ranch bluestem grass was not a result of special breeding, but was a selection of a native grass which has been isolated and grown for seed. Another odd development is the building of a special flame thrower, called a pear burner, which burns the spines off cactus during drouth to make them edible for cattle. And at the other end of the scale was the creation of a giant mesquite plow capable of shearing off trees four feet in diameter and piling them in windrows.

This plow—the King Ranch has two of them—is made by removing the left set of tracks from one D-8 Caterpillar tractor and the right tracks from another and then welding the two machines together so that each 65 horsepower engine drives one track. The two-engined giant then pulls a 16-foot wide blade which cuts along some 14 inches under the ground. The tractor straddles the trees, breaks them down and presses them into a central windrow while the blade sheers them

off under the ground. The whole operation can be done for $4.00 an acre if the tractors are kept running constantly—three shifts each day the year around.

The King cowboys live in villages of trim white houses each with its own flower garden. In the morning, they report to the corral and they and their horses are trucked to the range where they are to work. At noon another truck brings their lunch and at night they and their horses commute back to the ranch. Every male child, as a matter of ranch policy, has a job on the ranch if he wants it. "It is, after all, their home and their father's home and their grandfather's home," one of the managers said.

When asked if they had any problems getting help, he said: "Oh, no. We raise our own labor right here on the ranch."

The Dinosaurs

Today, the hot, dry winds are parching the range for the third year; beef prices have been cut in two; and even the biggest ranches had to buy feed for their cattle to survive. At times like these, some people begin to wonder if the big ranches aren't like dinosaurs, too big to survive.

The oil-rich ranches are a little different—oil and water never did mix and their income isn't affected by the drouth. In the past their problem has been to plow back into the ranch and into ranch-living taxable money from their oil.

The real problem comes with cattle ranches like Pitchfork which by mid-July had shipped all their thousands of yearlings to their own and leased pastures in Wyoming and were sending old cows to market. Pitchfork has no oil income. D. Burns said: "We are a hard luck outfit—all the drillers ever strike around here is gyp water. It reminds me of the story about old W. T. Waggoner. When they first struck oil on his land, he is supposed to have said, 'Hell, what do I want with that stuff? The cattle can't drink it.' Right now we are glad to have water."

The giant ranches unlike the dinosaur have adapted themselves to changing times. Cars, good roads, and airplanes make it possible for a rancher to keep on top of every operation on the ranch. Improvement of the cattle and the range and water conservation are all-year jobs.

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Made of strongest aircraft aluminum alloy, Rain Control gives ease of handling with highest resistance to wear and corrosion. Only Rain Control provides a coupler with adequate foot support, positive lock, two-bolt ring clamp to hold steel hook that eliminates slippage and pipe damage, no-blowout gaskets automatically drain when pressure is off, two-bolt foot clamp provides attachment to pipe without drilling, punching or welding. Can be coupled or uncoupled from middle of pipe. Fits any ground. Readily adapted to any acreage.

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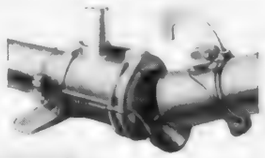

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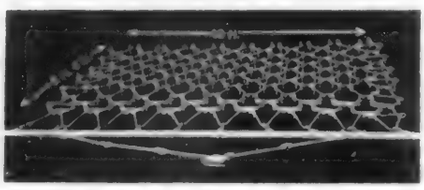
he bought his from me.

In the spring issue of this magazine on page 100, the article "Unlocking Your Pastures" boosts the flexible harrows *sky high*. Special endorsement is given by Cy White who has been using the No. 113 Aitkenhead Harrows since 1947. This year two new types have been added—Numbers 43 and 52.

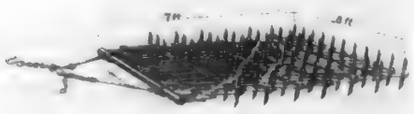


THIS IS OUR No. 113

no. 113

10 ft. wide, 8'6" deep
Weight 300 lbs.
Distribution 3½ lbs. per sq. ft.
Spring steel links 7/16" thick
Tines 3½" long
Patent links cannot open

Being equipped with Patent Scraper Bars, it makes the World's Finest Pasture Harrow

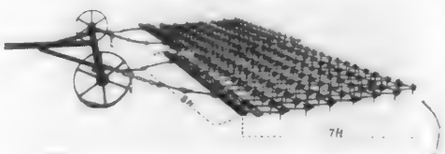


THIS IS OUR No. 43

no. 43

RIPPER 8' wide, 7' deep
Approx. weight 350 lbs.
6¼ lbs. per sq. ft.
9/16" spring steel links
Flat tines 1¼" x 5¼" long

For rough matted pastures and arable work. Equipped with Renewable Double Tines. Complete cultivation without burying topsoil is possible.



THIS IS OUR No. 52

no. 52

LIGHT RIPPER 8' wide, 7' deep
Approx. weight 275 lbs.
5 lbs. per sq. ft.
Links 7/16" spring steel
⅜" in round tines
4½" and 2½" long

Equipped with Renewable Tines.
This Light Ripper can be used on well-grazed pastures and light arable land.

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LEN RAYNER

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The drouth is putting a squeeze on ranchers and many of the small ones have folded and the best heeled of them shake their heads when they look at the burned range. Will they fold, too? One of the older men said, "When I was a youngster, I talked to old timers who remembered the terrible drouth of 'eighty-five, when one rancher walked off his place leaving fifteen thousand dead cows, and it was said you could walk for miles on dead cattle without touching ground. They toughed it through and, by golly, we're the same breed of men. Since we can't make it rain, we'll tough it through, too."

PRACTICAL GENETICS

(*Continued from page* 71)

geny tests, production records, or any other available method.

The next step, fundamentally, is to increase homozygosity for the characteristics in each generation of offspring.

Inbreeding

Obviously, the surest and quickest way to do this is by inbreeding; by breeding a brother to a sister, a sire to his daughter, or a son back to his dam. This increases the homozygosity in the offspring for the good characteristics. But, unfortunately, it is another one of those two-edged swords and increases the homozygosity for the bad factors, too. It's a wonderful tool in the hands of a master breeder, but it's dynamite for an amateur.

Comet, one of the first great Shorthorn bulls, was bred this way. He was by the bull Favorite and out of Young Phoenix, a daughter of Favorite from his own dam. Charles Collins, one of the creators of the Shorthorn, planned that breeding over 150 years ago. It is not recommended that his example be followed except by those whose bank account is large enough to support the extensive culling that such a program would make inevitable.

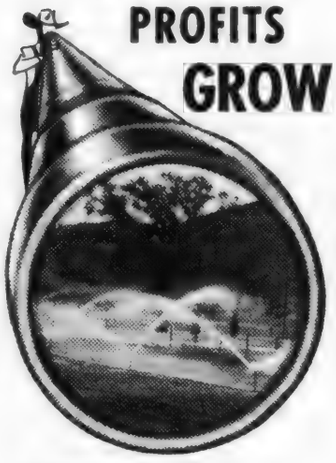
Linebreeding

A less intensive and less risky means of inbreeding is linebreeding. Using this system, the breeder maintains a high relationship in his animals to some outstanding sire or dam, usually a sire, the object being to keep as high a percentage as possible of the "blood" or genes of this exceptional individual in the herd. Robert Eddy, a Vermont dairyman, has followed such a pattern with great success. (FARM QUARTERLY, Winter 1952, p. 66). Newmont Dean Trixy is a good example of one of his linebred pedigrees:

Newmont Dean Trixy	Newmont Aristocrat	Newmont Aristocrat 10
	Dean	Newmont Dotty
	Newmont Aristocrat	Newmont Aristocrat 10
	Tina	Newmont Tina

Newmont Aristocrat Dean and Newmont Aristocrat Tina are half-brother and half-sister and each carries 50 per cent of the "blood" of Newmont Aristocrat 10.

WATCH YOUR PROFITS GROW



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This mating of half-brothers and half-sisters is typical of linebreeding and the mating is seldom made of animals of closer relationship. However, an intensely linebred pattern might also be as follows:

$$X\begin{cases}A\\B\begin{cases}A\\C\begin{cases}A\\D\end{cases}\end{cases}\end{cases}$$

In this instance, X is intensely linebred to A. He is by A and his dam and his granddam are by A.

There is no point at all in a breeder practicing linebreeding unless he has a really outstanding individual to use as the foundation for his program. But once his stock have been raised above the average of the breed he will probably be forced to resort to inbreeding or linebreeding to maintain his superiority. If he breeds to outside sires that are inferior to his own he will dilute the homozygosity of his animals and will begin to slip back toward the average. On the other hand, as was pointed out above, there is always the danger inherent in any inbreeding or linebreeding program that if the breeder is not extremely careful in his selections, the degeneration that is inevitable with inbreeding through the doubling up of the lethal and other undesired genes, may counteract all the progress he has made in the preservation of the good characters.

It is never a good practice for a man working exclusively with grade animals, or using purebred sires on grade animals, to practice linebreeding. No matter how outstanding some of the resulting offspring might be they can never be registered and could not be sold for a price high enough to compensate for the risks he takes in getting a lot of undesirable culls.

Outcrossing

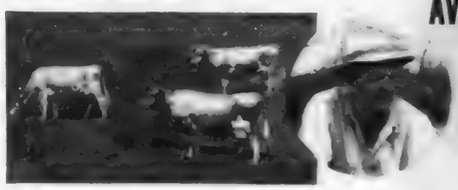
The rank and file of purebred breeders practice outcrossing—that is, the mating of animals of one breed with others of the same breed, but of no close relationship. Improvement depends almost entirely upon the breeder's ability to practice skillful selection. This is where "the eye of the husbandman" comes in, that extreme familiarity with his stock, their good and bad points, together with an almost instinctive "feel" for a good animal, its points of conformation, feeding efficiency, and breeding qualities and the ability to match sire and dam in such a fashion as to produce quality offspring.

Eventually, those who practice inbreeding and linebreeding have to resort to outcrossing to eliminate some of the bad characteristics that inevitably crop out.

Crossbreeding

Crossbreeding is the practice of mating animals of one breed with those of another. In some instances it is used for the development of a new breed. The Santa Gertrudis cattle of the King Ranch, in Texas, which are five-eighths Shorthorn and three-eighths Brahman, were de-

"Breeding registered Guernseys is a profitable business for me," says Vernon D. Mudgett, owner of Deershorn Farm, Sterling Junction, Mass. Illustrated below, 3 full sisters included in his home-bred herd.



"$537 AVERAGE ANNUAL INCOME OVER FEED COST FOR EACH GUERNSEY COW!"

"I've proved it's just as cheap to raise purebred Guernseys as grade cows — and it's far more profitable," says Vernon Mudgett. "I've never had a heifer that didn't make forty pounds of milk with her first calf — on twice-a-day milking. As a straight milk proposition, my farm makes money. Any sale of animals is that much more income."

Deershorn Farm herd averages and income over feed costs for the past 4 years:

Year	No. Cows	Lbs. Milk	Lbs. Fat	Income over Feed Cost
1949	18.4	10248	533	$584
1950	17.4	10938	573	584
1951	18.7	11116	573	[illegible]
1952	20.0	10276	539	518

Typical of Deershorn's long-lived Guernseys is *Deersborn Foremost Primrose*, now on retest at nearly 10 years of age. In November alone, she produced 1608 lbs. milk and 95 lbs. fat — valued at $114 over feed cost.

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Science in the Barnyard

By DR. HESS

Mama sows on our Research Farm are raising larger families than usual. Lots more baby pigs are living to weaning age, and much of the credit for this low death rate goes to Dr. Hess' new Pig Plants. We've known for some time that bacitracin, an antibiotic, would protect newborn pigs from many ills that kills them off. How to give daily doses to sucklings presented a problem. We solved it by using bacitracin pellets. A single pellet is "implanted" just under the skin behind an ear when the pig is 2 to 5 days old. Very slowly absorbed from day to day, the effect lasts until after weaning.

It works like a charm! We have been able to save 60% of the pigs that normally die between birth and weaning. And the litters weigh 10% to 17% more at time of weaning! Of course, the biggest benefits occur with fall pigs which may be handicapped by weather and therefore more susceptible to disease. Your Dr. Hess dealer has Pig Plants.

Now is the time to watch for symptoms of necrotic enteritis. This bane of hogmen is to blame for a big part of the 40% of all hogs that die before reaching market. "Necro" strikes at all ages. Early signs are fever, loss of appetite, and diarrhea. Safest procedure is to keep Dr. Hess Necrono on hand and use it as a drench for pigs too sick to eat. Give it in slop to those that have been exposed. The cost is less than 50c a pig—and that may save a couple hundred pounds of pork. Get Necrono from your Dr. Hess dealer.

From Pigs . . . To Pork . . . To Profits is a new booklet outlining six steps toward making more money from your hogs. A postcard will bring it.

Put yourself in their place and you can see why chickens get all upset and stop laying from being caught and handled for individual worming. That's why we lean to flock treatment, with Nicozine in their mash. It gets 99% of the large roundworms and cecal worms. There's no danger of one getting too much or another getting too little when flock-treated. Nicozine is our trade name for a balanced combination of nicotine, bentonite, and phenothiazine. Better get Dr. Hess Nicozine.

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"If it hadn't been for Pig Plants, we'd have needed only one buggy."

veloped in this way as were also the Minnesota Number One hogs, produced by a cross of the Danish Landrace hog on the English Tamworth, and the Columbia Sheep, the result of crossing Lincoln rams on Ramboullet ewes.

It is also frequently resorted to in order to bring in hybrid vigor. Just exactly what causes this increased size and strength in individuals that are the result of crossbreeding is a question for which geneticists are still seeking an answer. One opinion is that the more heterozygous an individual is the more vigorous he will be. Another school is of the opinion, though, that there is a certain complimentary action of the genes that causes the vigorous condition. According to the latter view, the most "pure" bred individuals might prove much healthier and more vigorous than crossbreds.

The principal drawback of crossbreeding is that the offspring of these matings are more heterozygous than their parents. This makes selection very difficult.

Upgrading

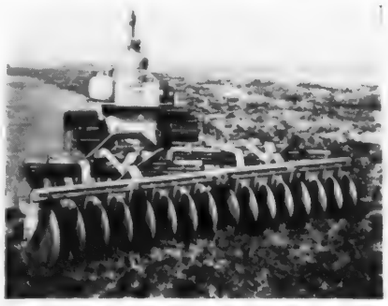
One of the least expensive ways for a farmer or breeder to acquire a flock or herd of quality animals is by breeding common grades to good purebred sires. The greatest improvement will be seen in the first generation. After that the rate of improvement will be reduced with each succeeding generation, but within the fourth generation of crossing his stock will be 15/16 purebred and, if he has practiced careful selection, they will be hardly distinguishable from purebred stock.

Nicks and Others

Besides the various breeding patterns that have been enumerated there are several other points that are always items of more or less heated discussion whenever two or more breeders get together.

The matter of "nicking", for instance, is one of these. When a sire and a dam produce an outstanding individual, superior to either of the parents, they are said to have nicked well. Again, certain male lines are said to nick well with particular female lines. Man o'War was the result of Major Belmont's enthusiasm for nicking the blood of Fair Play with that of Rock Sand by breeding Fair Play to Rock Sand mares. But there was only one Man o'War. What seems to happen in a nick is that in that one particular instance each of the parents transmits genes for some very good characters and they pair up in just the right manner when the sperm fertilizes the ovum. Environment, too may have much to do with a good nick. Not that environment is going to cause any sudden mutations, but simply because the exceptional individual may luckily have gotten into the hands of a fine trainer or stockman who knew just how to handle him to produce a champion. The thing for the breeder to remember is that he had better not permit his fascination for nicks to cloud his judgment when it comes

FALL PLOWING THE TOWNER WAY



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to selecting his breeding stock. "Homozygosity" is harder to spell but it means a lot more when it comes to quality.

This brings up the question of the relative importance of the sire and dam in producing good stock. Generally speaking, one is just as important as the other. We have seen how purebred sires can be used on grade females to raise the quality of a herd in a relatively short time. The point is that had these same sires been used on good purebred stock the improvement would have been even more rapid if—and again a qualification is necessary—the females to which they were mated were not of such quality that the mating would be a backward step. The breeder can never go wrong breeding the best possible animals he can put his hands on, male or female. More rigid culling is usually practiced among the males because they are used so much more than the females.

Cattlemen, to the exclusion of other livestock breeders, are plagued by the problem of the freemartin. The freemartin is a sterile heifer that is born twin to a bull. Sterility occurs about nine times out of ten in such twinning and is caused by the hormones secreted by the developing bull and carried through the mingled bloodstreams of the two fetuses acting unfavorably upon the sexual development of the heifer.

Telegony

Finally, there is the question of telegony. Although there is no theoretical or experimental basis for the belief, some breeders still feel that if a purebred female, for instance a Hereford cow, is mated to a grade bull or a bull of some other breed, she will continue to transmit some of the characteristics of the first sire to her calves by subsequent sires even though the latter were purebred Herefords.

The informed breeder realizes that this is pure bunk. But it wasn't so many years back that certain breed associations refused to accept for registration any of the purebred produce of a dam that had had an earlier mating to a sire of other than her own breed.

This was Jake Schuster's introduction to the science of genetics. If, like Jake, you would really like to master the subject, you'll find all it takes is a long life of hard study.

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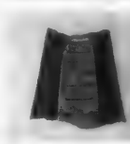

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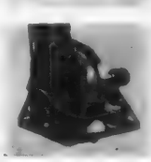

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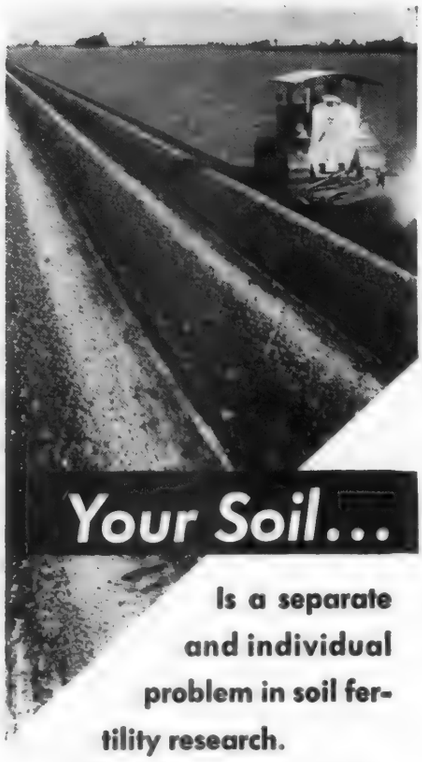

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FLOWERS FROM THE WILDS

(*Continued from page* 55)

and I knew he needed the money, so Saturday I asked him if he'd work next day.

" 'Well, Bump,' he says, 'I been brought up against workin' on Sunday and I'd rather not.' I found out Monday, though, that he spent the whole day fishin'. And a few days later, one morning after a rain, I heard one of his kids say, 'Pa, we just gotta get that old roof fixed. That water come right down in my face all night.' One day of time-and-a-half would have fixed that roof all right."

At the grading house—a big stone barn with a tight mow that can be used as a second floor work room—Haidee Wild's crews of a hundred or more women sort the buds, first into three grades on the basis of tightness of bud. Then they are graded for length of stem, tied in bunches of a dozen each, put back in their crates and hauled to the refrigerated warehouse on the home farm. The cut flower fields are all on the "big" farm or "new" farm, as it is called, a couple of miles to the northwest of the home farm. Allen Wild bought this 400 acre tract a few years back just to get 80 acres of real peony land—a red loam soil—and moved thousands of plants up from the "old" farm.

At the warehouse, the cut peonies are soaked in tubs of water for two hours and the foliage is sprinkled before going into the cooler. This sprinkling process is an added step that is against the rules.

"No other growers would think of doing a stunt like this," Allen says. "They say I'm crazy to do it and maybe they're right. But it works. Makes the buds keep much better.

The cooler is a big refrigerated room, a $40,000 investment, with a capacity of 80,000 dozen flowers. With the temperature kept at 34 to 36 degrees, the flowers can be held until the end of August, if need be.

Toward the end of the peony picking season the iris, too, are in full bloom. Blossoms from hundreds of varieties are picked daily and exhibited in pop bottle vases on long tables in the shipping room for viewing by the customers and tourists until shipping day arrives. Then it's literally a case of "Katy bar the door!" No one is admitted but the packing crews.

The peony buds are packed nine dozen to a box and go by refrigerator car or air express to points as close as Tulsa and Wichita and as distant as Boise, Idaho, Chicago, Detroit, and New York. Seventeen carloads is the usual crop. They go to florists, dime stores, department stores, novelty stores, and hawkers at cemetery gates all over the country.

The Market

The Wilds sell all their cut flowers direct. "We've had some unfortunate experiences with brokers," Allen says. "They won't handle the flowers except on consignment and want terrific commissions.

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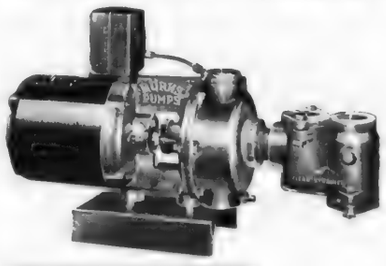
FOR YOUR FARM



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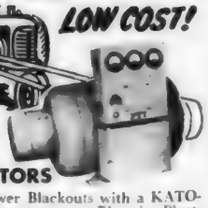

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We have no trouble at all moving our flowers right to the dealers. I haven't put out a cut flower list or advertised them for over twelve years and I still never have enough flowers to meet the demand. To keep our customers happy we always send them a few more flowers than they order so that if any arrive in poor condition there are replacements right at hand. For instance, we usually send 1030 dozen when we fill an order for 1000 dozen.

"The demand for the cut flowers is so great I sometimes wish I had another 200 acres of peonies; but the labor and storage requirements would be too much."

The Wilds name their own prices. This year it was 84 cents a dozen. Sounds easy just to sit back, name a price, and get it. Yet only years of experience in the flower business can teach a man where that happy cent is that will move his crop at a profit. Make it a fraction too high and he'll wake up May 31 with a large corner on a very dead flower market. Pitch it too low, and he's missed a share of his profits.

Right at the height of the peony season the Wilds stage their annual Peony Sunday. Since one-third of the blossoms are left on the plants, the stranger never notices that any have been cut, and on Peony Sunday thousands of flower lovers trek to Sarcoxie for a free tour of the Wild fields and treat themselves to the glorious sight of acre upon acre of nodding blossoms.

Cultivation

As soon as the picking season is past, the unending cultivations begin. This is one operation where the tractor has been unable to displace horse and man power. Six big percherons, working in single hitches, pull their plows back and forth, up and down the rows of plants, and the man with the hoe is a common sight in the flower fields.

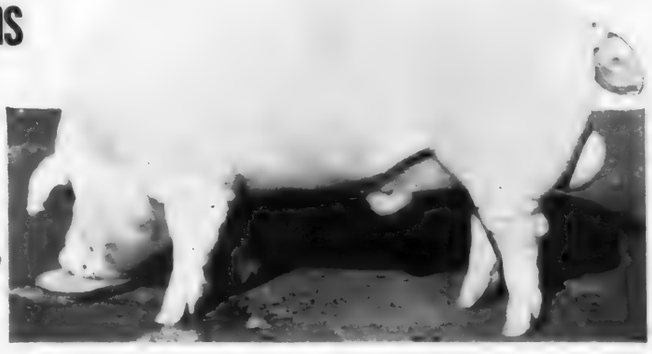
"Hoeing costs us $1,000 a week," Wild estimates. "I'd like to use a chemical weed killer, but I wouldn't dare try it. I know a grower who tried it out on a small piece of ground and it cut his yields over 50 per cent. If it will kill the weeds, it'll get the plants, too."

Dig Those Bulbs

August 15 is opening day of the shipping season for peony plants. This is when the amazing talents of Wild's digging foreman, John Block, begin to come into play. Block, now in his forties, has been on the farm since he was eight years old. To say he knows every inch of the place is a cliche that tells only part of the story. His knowledge of the business is measured in three dimensions. He knows not only what's on every acre but what's under it as well.

Given a tubful of orders, Block sorts out the tags according to specimens—30 Baroness Schroeder, 30 Exquisite, 10 Cathie Ann, 50 Karl Rosenfield, 40 Ozark Beau-

NATIONAL GRAND CHAMPION from a line of champions



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You will like these 5 near yellows.
FANNY CROSBY, yellow with pink guards
J. C. LEGG, yellow fading white
PRIMEVERE, sulphur yellow, white guards
THURA HiRES, white, overlay of lemon
TRINKET, white with yellow underglow
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A "Keynote" Peony Collection

GEO. W. PEYTON, pinkish blush fading to white
HERMIONE, apple-blossom pink
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These 4 beautiful double peonies prepaid in U.S.A. for **$5.00**

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ty, 60 Lady Kate, 25 Victory, and so on. Then, pipe in mouth, he hops in his pickup with his crew of seven men and he's off for the fields.

The plants are all tagged in the fields as they are dug. At the packing house they are sorted out in alphabetical order on the floor and the orders are filled.

Daylilies are dug and shipped the year 'round, with the exception of mid-winter. Iris shipments begin about the end of June. If the plants are dug while in bloom they may not bloom the following year.

Rotations and Fertility

As fall comes on, preparations for the next year get under way. Rotations on the cut flower fields are long—20 years; and the clean cultivation is hard on the ground. To maintain fertility and humus on these fields as well as on the plant fields, 20 carloads of manure are hauled to Sarcoxie every year from the Kansas City stockyards. This, along with truckloads of turkey and chicken manure that is picked up locally, and steamed sheep manure, provides five tons or more of organic matter for each acre of flower or plant producing land on the farms each year. Besides the manure, Wild sees to it that his fields also get an application of 300 to 400 pounds of 4-12-4 every year.

"The 4-12-4 is all right as far as it goes," Wild says, "and we also use such name fertilizers as Vigoro and Velva Green. When it comes right down to it, though, we need a lot more potash on these peonies. They really eat that stuff up. This year I'm going to use a 6-12-20 fertilizer, if I can get it, and put on 400 pounds to the acre.

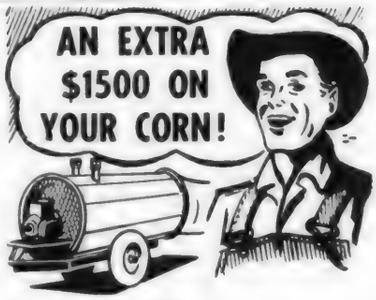
"Another spot where I think our fertilizer program is weak," he continues, "is on application. We put the stuff down too shallow. We're going to use subsoilers on as much of this land as we can get over this fall and put that fertilizer down 10 to 12 inches deep."

On the cut flower fields, the dirt is ridged up around the plants every fall as protection against severe weather, and dams are thrown up in the rows to check the rush of runoff water and provide protection against erosion.

To insure huskier plants, peonies in the plant propagating fields are dug up every three years, the iris and daylilies every two years. They are taken up in the fall and transferred to another field. The field from which they have been taken may be planted to one of the other species; the iris or daylilies may follow the peonies or the peonies may follow the iris or daylilies without the intervention of a soil building program. Peonies cannot follow peonies, though.

"That's a funny thing," Wild notes. "You can follow peonies with practically anything, even come along with corn if you want to, but don't try to put in another crop of peonies. They're gluttons for potash and some minor element, don't ask me what it is, because I don't know.

THIS FALL



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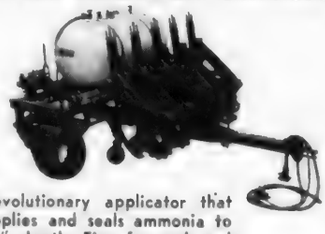

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What I do know is that I just won't try to follow peonies with peonies."

If it is decided that a particular field needs a little rest and rebuilding, a winter cover crop is sown after the plants are dug. The cover crop is turned under and followed by soybeans. The soybeans go under, too, and then the new plants are put in. Plant population on the farms runs anywhere from 4,000 to 14,000 per acre.

Moving Day

One of the biggest transplanting jobs in Wild history came a few years back after the "new" farm was bought north of town and the cut flower plants were taken up by the thousands from their old homes and moved to the red loam of the new place.

A large part of this work was hand labor, though much of it was done with the help of nursery-type tree diggers and potato diggers.

"When I finished that job I took a little inventory," Wild recounts. "Found I had $50,000 worth of plants in one six-acre field, and $100,000 worth of year old peonies in the adjoining ten-acre plot. One row over there has 100 Doris Coopers at $50 apiece and 50 Ann Cousins at $80."

With fifty to one hundred thousand dollars worth of plants to a field you'd think Wild would want a ten-foot chain link fence around each plot with an armed guard at the gates. Actually, the only precaution he finds necessary is a hoeman in each field when the blooms are out.

It's pretty hard to get a congenital optimist like Allen Wild to admit that occasionally there are some little setbacks to be expected in the flower business. This spring's cancellation of 14 carloads of cut peonies—78,000 dozen at 84 cents a dozen—to him is "just one of those things" and now largely forgotten in the anticipation of next year's crop. Then there was the year that seven minutes of hail wiped out the entire crop at cutting time and the year a ten-inch snow storm in April made it completely unnecessary to hire any picking hands. These things, of course, are just tough breaks. "Why bring them up?" is the way Wild puts it.

Wild says about diseases, "The iris are troubled sometimes with leaf spot, but it's not serious and we don't do anything about it; and the iris borer isn't a problem with us—yet. The only thing that bothers daylilies is dry weather."

Damp weather causes botrytis, a kind of fungus growth in the peonies. The manure seems to provide the conditions favorable to the disease and for that reason many growers shy away from its use. Wild is willing to take a chance on the botrytis for the sake of the organic matter. "We spray with Bordeaux mixture or copper hydro-40 three times—when the plants are just coming up, when they are about 15 inches high, and just before blooming.

He's foraging two rows at once — cutting, chopping, loading larger quantities of silage than ever before — every hour, all day long — all by himself! No loss traveling — he simply moves from one farm to the next, opening fields in any desired spot — because every farmer wants him, to speed up the forage harvest without loss of valuable crops.

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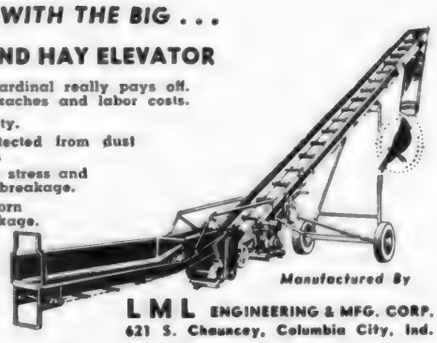

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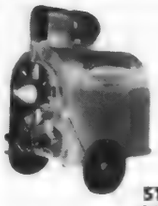

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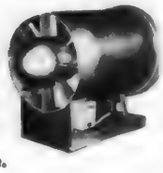

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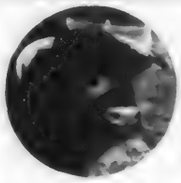

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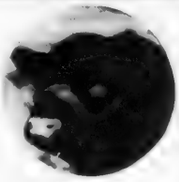

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That pretty well takes care of the botrytis," Wild says.

"Only other trouble we have with the peonies," he continues, "is root rot. That's most prevalent in the red varieties and is caused by wet weather. The reds just can't stand wet feet."

The sheer numbers of peonies on the Wild farms tend to push the other flowers into the background, but, outnumbered or not, the iris put on a flashy show of their own about the same time the peonies are in their glory. Then, when their earlier competitors have dropped out of the game, the daylilies come along in the middle of the summer.

Wild does no cut flower business in iris. The blooms do not keep and pack well. His iris plant business, however, is on the typical Wild scale—big—and his collection is said to be excellent. Shrewd salesman that he is, you'd have a hard time getting him to admit which of his specimens is his favorite. "You have to grow what the customers want, not what you like," is his philosophy. The clear blue Great Lakes and the spectacular orange Rocket are equally as dear to him as the bicolored Wabash and the plicata Minnie Colquitt.

About the future of flower farming "Dad" Wild speaks for the whole family: "We can't see anything to worry about. You can sell all the cut flowers you can raise if you have them ready for Mother's Day and Decoration Day. And all this residential building that is going on all over the country means there's going to be a big demand for plantings for a long time. People want flowers to brighten up a place. Folks who love flowers will skimp on a lot of things before they'll give up their plants. Even in the depression, we weren't so bad off. Sure, business fell off, but it didn't cost so darn much to live."

SHIPPING FEVER

(*Continued from page* 57)

trailer rates on an additional car rather than to jam too many in a single car. The cars should be well-bedded and lined with paper if the weather is severe."

Many old-timers realize, Cuff says, that a legal 36-hour run with five hours off for switching, feed, rest and water is hard on cattle, particularly after they have already had a long drag to the shipping point. The stockman who considers the health of his cattle more important than the running time on the road, will break the trip into from 24 to 28 hour runs and then give the cattle a full 5 to 10 hours for rest, feed and water. The same policy should be followed from the markets to the feed lots.

Cattle Feeder's Headache

"Shipping fever is one of the major headaches of any feedlot operation," says

Dr. James L. Palotay, resident veterinarian at the Monfort Feed Lots just outside Greely, Colorado. "And here at Monfort where we feed out about 25,000 head of six-months to three-year-old cattle a year on an 80-acre lot, that hearache takes on a sizable proportion.

"It's suprising to me," Dr. Palotay says, "that more of our animals don't get sick. They are rounded up somewhere in Texas, New Mexico, Montana, Nebraska, or Kansas, then hustled on a train for a one to five day ride, often going through as many as four or five yards on the way. By the time they reach the lots they are a pretty tired, hungry, homesick bunch. We can't do much about the homesickness, but we do get down to the essentials at once and provide them with a clean, dry place for the resting period, clean, fresh water, and as nearly the right kind of feed as we can find."

Most feeder animals have been on pasture all summer, Dr. Palotay says, so it is logical that native hay would approximate as closely as possible what they have been used to before reaching the Monfort lots. Oats are also included in the starting ration for the calves and are gradually tapered off as the calves are brought on feed. It is best to stay away from hot feeds, such as corn, until the cattle are definitely over the hump.

"The stock we get usually have not been vaccinated with either bacterin or serum before shipment and we do not now use either of these products after arrival.

"Our loss from shipping fever will vary with the age group of animals," Dr. Palotay says. "We usually have the highest incidence in the younger stock. I read in one issue of FARM QUARTERLY about a man, feeding urea to a group of calves, who took a five per cent loss which he attributed mainly to shipping fever. Fortunately our over-all loss from all disease is less than this figure."

Shipping fever plays no favorites as to herd size. Around Mallard, Iowa, there are a lot of farmers like William Baxter and Ronald Carmichael who take on 50 to 150 head of feeders every fall to increase the efficiency of their farming operations. They are plagued with the disease as much proportionally as the big feeder cattle operators.

"To my way of thinking," Baxter explains, "shipping fever can best be avoided by careful handling and the right loading of trucks and freight cars. As soon as my stock gets in from North Dakota each fall, I isolate them from any other stock I have on the place, feed them lightly, and give them plenty of rest in a dry, warm place.

"Shipping fever can't be avoided entirely," is Ronald Carmichael's opinion, "but the number of cases and the severity of the cases depend on how the cattle are handled. Out of the 150 head of heifers I feed out each year, about 25 to 50 per cent will come down with shipping fever to some degree. The calves that have had a hard trip, been held a long time in the yards, or roughed around in general, are the ones which cause the trouble. If the vet treats them as soon as the symptoms first appear, they will be fine again in three or four days with no ill effects."

"Shipping" Fever Misnamed

In some ways the term "shipping" fever is a misnomer and, as a result, causes some confusion. Actually what we call shipping fever is not always associated with shipped-in cattle. Dairy and beef cattle may be affected without ever being moved from the home farm or without outside cattle, which may be infected, being moved in.

"I found out the hard way that you don't have to ship cattle to get shipping fever," says Sam Marting, who raises registered Herefords on his Bea-Mar Farms near Washington Court House, Ohio. "It cost me 42 head of calves one fall in the early '40's. That much of a loss is bad in any kind of cattle, but every last one of those calves was a purebred animal. Most of them were by our Real Prince 85th bull which had been a top winner on the circuit the summer before. We were counting heavily on his calves that year—many of them had already been pre-sold and others were spoken for.

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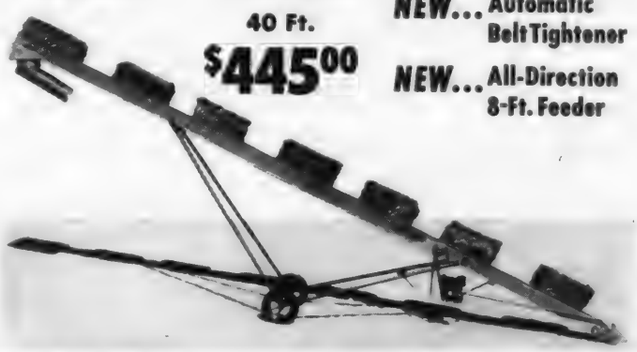

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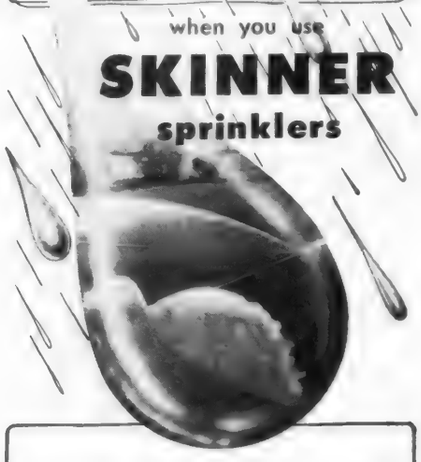

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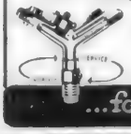

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"All the trouble started late in October when we were having some of the on-again-off-again fall weather," Marting says, checking back. "We decided to start moving about 70 head of the calves in from pasture to the barns to start fitting them for showing. We weaned six head to start with and brought them in. In a few days I had a bunch of runny-nosed calves in the barn and within three weeks they were all dead. In the meantime I had brought in more from pasture and they started coming down, too.

"We thought it might have been caused by a drafty barn, so we insulated it until it was tight as a drum. We checked the feed off as being okay because the calves were getting the same ration they'd gotten from the creeps on pasture plus a little light timothy hay.

"The joker in the deck was that about three weeks before we had vaccinated all of them for shipping fever. Bacterin was just catching on then and we decided to give it a try. At first we thought we'd gotten hold of a bad batch of bacterin. The company in Indianapolis sent representatives out at once to try to clear the situation up. Our vet already had poured plenty of serum into them without much results when the company men arrived with a truck load of penicillin. This didn't do a lick of good either. They kept right on dying, regardless of what we tried, until 42 head out of the 70 were gone. A few of these lingered on until summer and finally died. I had two of these posted up at Ohio State and their lungs were shot to pieces. The calves that recovered never did go on to do well and were a pretty rough and common-looking bunch.

"Shipping fever has never hit me like that since," Marting says, "and I believe it's because we keep our calves in open sheds instead of closing them up in the barns—just enough protection to break the wind and keep their backs dry—and they do well."

How Good Is Vaccination

There is a difference of opinion about how good vaccination is just as there is a difference of opinion on other phases of the shipping fever problem. This probably arises from the fact that the degree to which an animal may become immune varies and, as a result, animals which have been vaccinated may still come down with the disease. Immunity may sometimes be overcome by a shipping fever germ of particularly high virulence, or by the lowering of natural resistance so much that even the immunizing agent is of little help against the disease.

The crux of the matter is that stockmen should not assume that because their animals have been vaccinated that is all that is necessary. Practical experience shows that while vaccinating with bacterin or serum is helpful, it cannot be expected to stand off the disease in all cases. The effectiveness of both bacterin and

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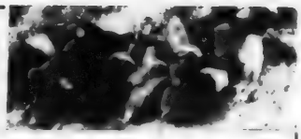

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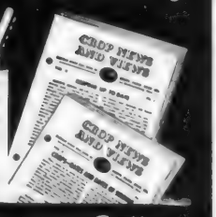

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serum are only as good as the care and management which cattle get before, during, and after shipment.

In the field today there are two products that may be used to help bring about immunity against shipping fever: 1.) hemorrhagic septicemia bacterin, and 2.) hemorrhagic septicemia serum.

Bacterin, the most common and the cheaper of the two products to use, is made from Pasteurella organisms which have been chemically killed so that when injected into an animal's system they can do no harm. Still their presence sets up an active immunity by causing the animal to produce a number of active anti-bodies of its own to combat any further disease germs of this type which invades.

This process of building up resistance with bacterins takes from 10 to 14 days before enough of these active anti-bodies can be produced to make the animal immune. Any time within this period the animal may contract the disease. The bacterins should, therefore, be used at least two weeks—and preferably longer—before an animal is to be shipped. Though it does take longer than serum to go into effect, bacterin has the advantage of giving longer lasting protection—from 6 months to a year.

The mixed bacterins combine killed Pasteurella organisms with the so-called diptheroid and strep-staph organisms and are said to give broader protection coverage than the ordinary hemorrhagic septicemia bacteria. The bi- and tri-bacterins are becoming increasingly popular, too. These mix the bacterins for hemorrhagic septicemia, blackleg, and malignant edema in twos and threes and speed up the work of vaccinating considerably in areas where cattlemen would ordinarily vaccinate separately for these diseases.

The second product available is the hemorrhagic septicemia serum. This is made from the blood of animals that have been previously hyper-immunized against the disease. When the serum is introduced into an animal's body it immediately protects the animal from disease for it is composed of anti-bodies already formed. These antibodies are passive, however, and will gradually be dissipated in the system so that they can be counted on for only two to three weeks.

If cattle to be shipped immediately have not been previously vaccinated with bacterin, serum is the thing to use at loading time. The cattle then travel under the protection of an immunizing agent. Serum may also be used when cattle first reach the lots after shipment.

Several laboratories are recommending the use of Corynebacterium Pasteurella bacterins and serums. These products combine the hemorrhagic septicema organisms with those of pulmonary edema.

Even with vaccination and the best possible handling from point to point, some cattle can be expected to come down with shipping fever. That is one of the

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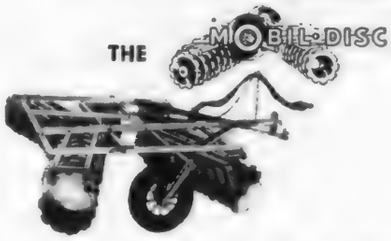

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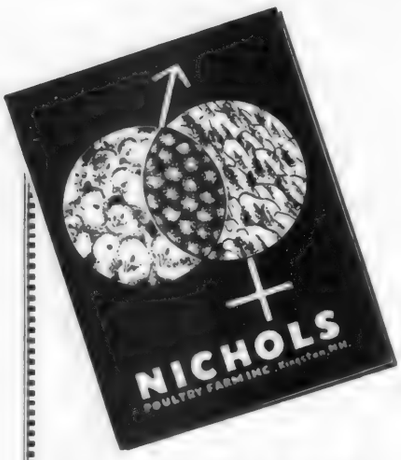

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peculiarities of the disease and one of the things which makes it a hard problem to deal with. Time was when few calls were more dreaded by the veterinarian than those for shipping fever or pneumonia. Since the sulfas and the antibiotics entered the picture, the successful treatment of shipping fever cases has become possible, making the disease a little less tough to fight. As in human medication, though, they cannot be used indiscriminately, nor do they always bring results. Any veterinarian will tell you that some sulfas and antibiotics are good against the shipping fever complex, others are not.

Just before 1940 word of the new sulfonamide drugs got around. The first, sulfanilamide, was the only one available to veterinarians and like an endless list of drugs before, it didn't seem to be of much help. There was some scepticism concerning the next sulfas until finally sulfathiazole came to the foreground as a drug which could really set this mysterious bug back on its heels. Sulfamerazine, sulfamethazine, and sulfapyradine have all been used successfully.

Sulfa medication is based on an ability to hold disease organisms in check until they are overcome and destroyed by natural body defense forces. Combinations of the sulfas offer advantages over the single sulfas because together they can halt the action of a wider range of bacteria than may be expected from one. Too, combinations of sulfas are considered to be less toxic than any one of the components used individually in equal dosage, thus lessening the danger from their use, particularly in young animals.

Even the sulfas have their limitations and cannot be expected to work all the time. Many cattle, sheep, and goats have failed to make recovery from sulfonamide treatment, or appeared to be recovering then died, because of overdosage and a consequent development of crystals in the kidneys. For this reason, when given in large doses, especially intravenously, the bivalent or trivalent sulfonamides are preferred. These drugs are selectively soluble in urine, which can hold three times as much without crystallizing if three sulfas are used instead of one.

Penicillin when used alone seems to do little, especially against the pneumonic form of shipping fever. When streptomycin was first tried, the response was almost unbelievable, particularly where there was intestinal involvement with the pneumonic form. Terramycin and aureomycin may very well be the best of the antibiotics against shipping fever, many practitioners believe, but the cost at this time is prohibitive except in specific cases.

"In my case," says Dr. Palotay, "treatment of animals coming down with shipping fever at Monfort's is governed by three things—the number of animals waiting to be treated, the condition of the animal to be treated, and whether it is an early case or an advanced chronic case.

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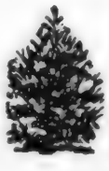

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The general run of animals respond favorably to either the sulfas or the antibiotics. I ordinarily use a combination of two sulfas with penicillin, or any one of a combination of the antibiotics such as penicillin, streptomycin, bacitracin, or terramycin."

Hemorrhagic septicemia serum is used by many veterinarians in treating shipping fever, either alone or in combination with the sulfas and antibiotics. And even in an outbreak of the disease, some veterinarians vaccinate all apparently healthy animals in the herd with bacterin, move them to isolated quarters, then watch them closely so further treatment may be given if they show symptoms.

"As veterinarian for the Producers' Stock Yards in Washington C.H., Ohio in addition to private practice," says Dr. D. E. Mossbarger, "I see about 600 to 700 head of feeders come through in the fall. We routinely vaccinate all animals which appear to be in good shape with bacterin, although they may have been exposed to shipping fever, and then isolate for treatment those which are apparently sick.

"At the yards we also add Gauicol Ammonia, bitter type, to the water. This acts as an antiseptic and expectorant. Other practitioners may prefer another type medicant such as sodium-sulfathiazole."

Operators on the Kansas City market, Ray Cuff says, are sold on the use of bicarbonate of soda—common baking soda—in the drinking water. "We believe this stimulates elimination from the kidneys and intestines and is also important in helping regulate the pH in the paunch so that the cattle will soon start chewing their cuds again."

Stockmen will tell you that although plenty of progress has been made since the time when a shipping fever case was a hopeless case, we are still losing too much beef, man-hours, and medicine to the disease. Unfortunately, research work to pin shipping fever down and then develop the sure-fire vaccine that kill it has been scant, spotty, and inadequate.

Colorado A. & M. College School of Veterinary Medicine is working in conjunction with the Monfort Feed Lots on one of the few college projects in progress.

THE SHEEP BEGINNER

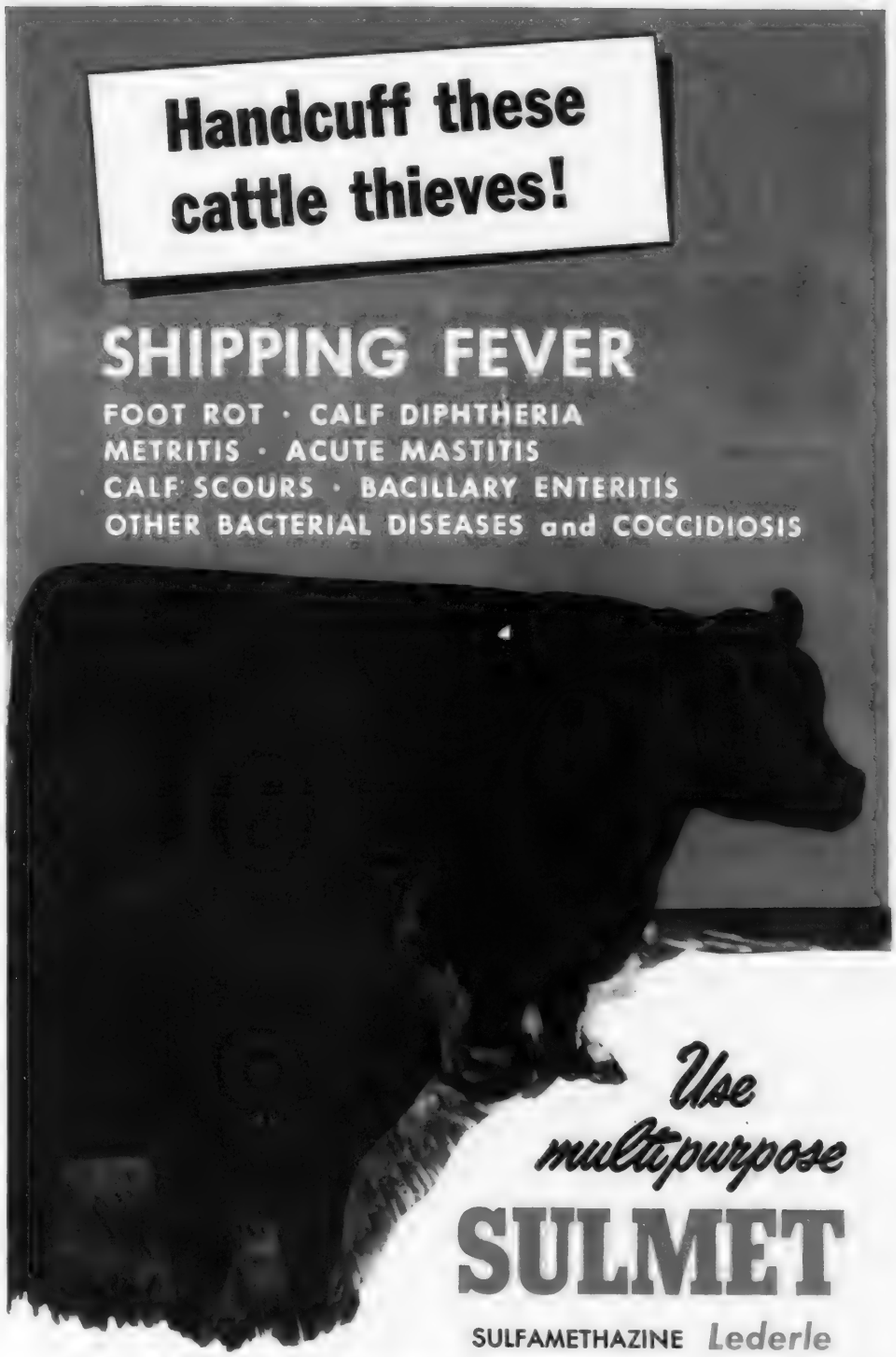
(*Continued from page* 50)

He gave her phenothiazine capsules, inserting them far back in her throat by means of a syringe. He suggested a diet of oats and bran.

After he had gone, my wife, who has a way with animals, said she would like to try out an idea she had.

"Go ahead," I told her. "Mrs. Murphy is so bad off one more dose of anything can't harm her."

She (my wife) made up a mixture of coffee and bourbon and poured it into a pop bottle. We went to the barn with it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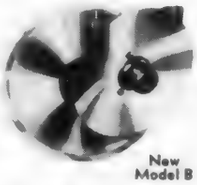

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and found Mrs. Murphy staring into a corner.

I read of a number of ways to throw a sheep, but hadn't tried any. I thought I would try the method advocated by the U.S.D.A. writer—"grasp the animal in front of the shoulders and lay her on her back."

I grasped Mrs. Murphy in front of her shoulders. She took off with surprising strength in one so debilitated, ran under a manger, cracked my head, and broke my hold. This apparently was not the correct method of handling Mrs. Murphy.

While rubbing my head, I invented a method of my own which I have used since and which works fairly well if you happen to weigh more than the sheep and your heart is sound. I stood over Mrs. Murphy, facing the front. Then I put my arms around her, back of the front legs, lifted, and sat down with her in my lap. After I had her back legs off the ground she quit struggling and became docile. I pried open her mouth with one hand and with the other inserted the pop bottle and drained it.

She seemed to like the concoction. An hour later she nibbled a little hay and seemed much brighter. The next morning she went out with the crowd and plucked a few spears of grass. That evening she seemed poorly again and she got another coffee cocktail.

Dec. 17: Mrs. Murphy's back-end looked like she had been sitting in a tar bucket, and she stunk. I threw her and went to work with a pair of shears. These weren't equal to the task and I tried our peach pruning shears, which was the tool for the job. When I got down to Mrs. Murphy's bottom I found it as bare as a new-born babe's, and covered with rash. Her tail had been docked too long and she had been trapping her manure all her life; there were several pounds of the offal. When she got back to her feet she had a good bowel movement, no doubt the first in a long time. I also clipped the wool from around her eyes. I cleaned up the other needy animals and felt they ought to be grateful. Amateur sheepmen with squeamish stomachs would enjoy a hired man.

Dec. 18: The coffee-bourbon prescriptions used on Mrs. Murphy had only temporary results. It took more and more to rouse her. One morning I found her unable to lift her head. That evening she passed quietly away. The vet came over and posted her and sure enough she was full of flukes, her intestines looked like they had been caught in a lawn mower, and all her giblets showed the ravages of parasites and age.

Mrs. Murphy was a lesson to me. Hereafter when I buy sheep, I swore, I would first have a look at the teeth.

Jan. 10: My books, the county agent, and Mr. Adams, my sheep-keeping neighbor, all agree that about a month or six weeks before lambing the ewes should

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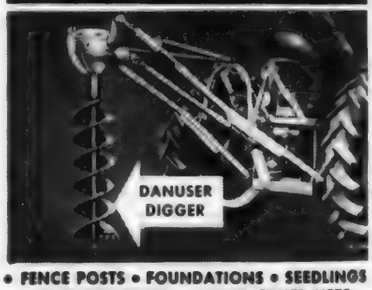

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have extra feed. "She's growing a lamb and developing an udder: she can't do that on hay or grass. She should put on a little fat," was the boiled down advice. So, since Mr. Sims had informed me to expect lambs about March 1, I started heavier feeding. I bought 100 pounds of 24 percent dairy mash and a bag of whole oats. I gave them a handful of the supplement, an ear of corn and about a half pound of oats in the evening. With the grass and hay this seemed to be about right. They began to fill out.

Mr. Adams pointed out an item in a sheep bulletin which sounded practical. "To build a good lamb," it said, "the ewe should have a mineral mixture added to her ration. Feed a handful of a mixture of 2 lbs. of salt, 4 lbs. of either bone meal or ground phosphate, and 4 lbs. of ground limestone." This mixture was made up for me at the feed store and cost 31 cents for the batch. Thereafter until they lambed I fed the ewes a handful or two a day. I never knew whether this was a good thing or not, but all the lambs were healthy, so I set it down as one of those things that couldn't do any harm and might do a lot of good.

Feb. 1: Mr. Sims had said, "They'll lamb about the first of March." Today my husbandman's eye fell on a ewe, afterward known as Mrs. First, who was spreading out and sagging in the middle at the same time. Inspection showed that she was making bag.

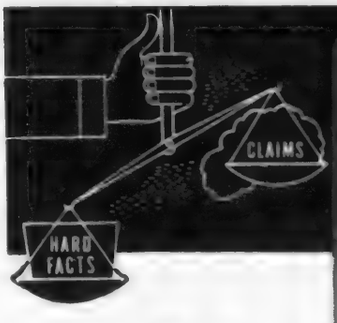
Feb. 9: The morning bag inspection of Mrs. First produced a stream of milk, so I assumed that the lamb was impending. I penned her in one of the small lambing pens I had made by standing an old gate across one end of the loafing parlor and cut off the corn in her ration and gave her hay, whole oats and bran.

Feb. 10-11: I watched Mrs. First pretty closely, looking in on her several times a day and the last thing before I went to bed. She ate contentedly, chewed her cud and occasionally bawled for the others.

Feb. 12: My wife and I got home from a movie about eleven o'clock, put the car in the garage, and stopped by the barn to check Mrs. First. From her dark corner Mrs. First bleated. She was licking a lamb and had not yet cleaned herself; the lamb was minutes old and my wife said, "He looks like Little Nemo." And Little Nemo he remained, although I found out, when I picked him up to douse his navel with iodine, that Little Nemo was a she.

I went out to have a look at Mrs. First about an hour later, but she had finished: Little Nemo was all. Mrs. First was bursting with pride and maternal solicitude, had cleaned herself, and the lamb was sucking.

Feb. 13: Kept good fresh water by Mrs. First, fed her all the hay she could eat and a small ration of oats and bran. The county agent suggested this ration. "The bran is slightly laxative," he said, "and the oats make milk. Corn gives too much en-



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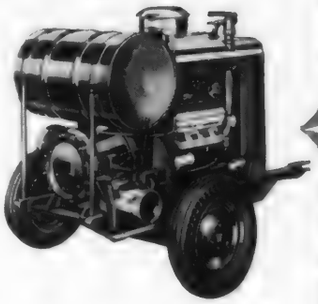

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ergy at this period when the ewe is likely to run a little fever." After three days I added two handfuls of the protein supplement to the oats and bran and turned her out with the lamb, which grew like a weed and in a week was nibbling on hay.

Feb. 17: Today I decided to dock Little Nemo. Since there is a choice of knife, elastrator, masculator or masculatome, I considered all four. The last three are instruments I didn't own and with my small flock I felt I could dispense with the cost. That left the knife or a substitute. I chose pruning shears. This implement, I reasoned, would partly crush and partly cut. A clean cut with a sharp knife, I learned, results in profuse bleeding.

I gathered Little Nemo in my lap, pulled back the skin of her tail toward her body, and closed the shears over her tail, the cutting edge on top. The shears did a good job. I poured iodine over the stub, pulled the skin back over the end, and snapped an ordinary spring paper clip over the overlapping skin. Little Nemo gave one alarmed bleat, but lost no blood, and when I sat her on her feet she immediately ran to her mother and started to suck. I left the paper clip on for about ten minutes; all the bleeding had stopped.

Feb. 28: The second lamb, a male, came last night. He was good sized but weak, and made only halfhearted efforts to suck. He couldn't decide which end was the dining room. I threw the ewe, Mrs. No. 2, and found that she was short on milk and her bag was covered with wool. I cleaned and clipped it and my wife attached Elmer to a teat. But either he had too little suction or he was working on a dry teat. We mixed two ounces of homogenized milk and molasses (in a baby's nursing bottle) and he went for it. We fed him every hour, each time encouraging him to work for himself on his mother.

March 1: Little Elmer was in a bad way this morning—closed at both ends. His eyes were pasted shut and he had a handful of excretion under his tail. I had read that sometimes a lamb's eyes are impaired by a growth of wool which turns into the eyes and irritates them. This was not the case with Elmer, who simply had sore eyes. Three or four applications of boric acid fixed him up.

The first discharge from a lamb, I learned first-hand, is an orange-colored, gluey mass which hardens like cement. I cleaned up Elmer's rear system with a corn cob and he went on from there.

Then his mother developed udder trouble; one side of her udder caked and the teat stopped functioning. The teat seemed to be closed so I opened it up with a sterilized needle and applied hot epsom salts packs. In two days she was fit again.

March 8: This morning I spotted our ewe, Little Sheba, standing with her head down, as if in deep thought. Little Sheba had started to fill out six weeks before and for the last month looked as if she would not only have twins, but a set of dishes as

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well. I maneuvered her into a lambing pen and visited her every half hour. At 11:00 o'clock she was still studying the ground between her front feet, and labor had not yet started. On my next visit, 11:30, she had two fine male lambs all cleaned up and sucking, and had cleaned herself. The lambs were almost black and we named them Pete and Repete. The ewe had plenty of milk—a heifer would have been proud of the flow—and Pete and Repete soon were able to hoist their mother off her back legs with the vigor of their nosing. Each apparently worked the same side each time, Pete on the starboard. Repete on the larboard.

March 15: Nemo gave me a start this morning. Down the inside of her hind legs there was a red stain, brighter than blood, but no less alarming. Bob Adams calmed me; the urine is sometimes stained by phenothiazine, especially in lambs. "Ignore it," he advised.

March 18: The books and the experts do not agree when a lamb should be castrated. Their recommendations vary from 3 days to 3 weeks. This morning, on the sound theory that it is cheaper to borrow than buy, I asked the loan of Bob Adams's elastrator to use on Pete and Repete.

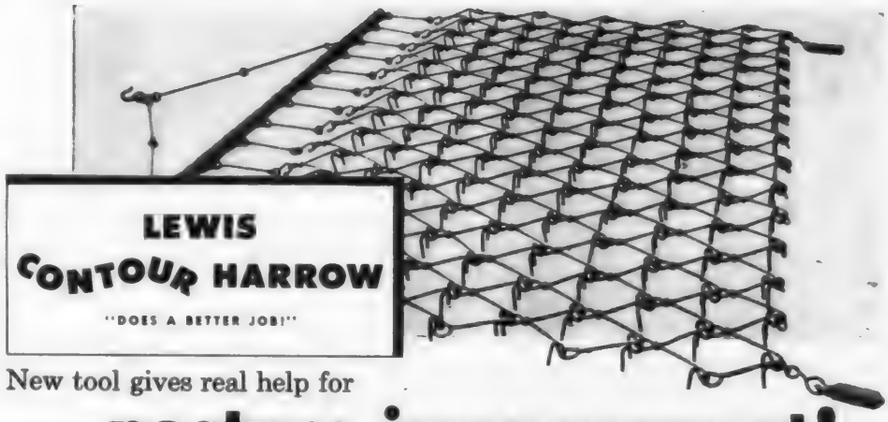
Mr. Adams has a new wrinkle in rubber band elastrators. Most of these implements are a pincers-like gadget which spreads the rubber band into which the scrotum or tail is inserted. The band is then released. Mr. Adams objected strenuously to the high price, $12 to $15, and combed the market for a cheaper article. He found it in an obscure advertisement in a sheep magazine. It's cheap, simple and easy to use, an aluminum cone which fits into a metal ring with a handle. The rubber ring is slipped down over the cone and onto the ring; then the scrotum is pulled through the ring, and the band flipped off with the thumb.

The lamb has an uncomfortable half-hour, but after that goes about his business as usual. The scrotum or tail shrivels up and drops off in five or six weeks.

I figured that docking and castrating are a double shock to the lamb, so I spread these operations two or three days apart. I stuck to the pruning shears for docking and the elastrator for castrating with no trouble or infection. Tried docking one lamb with the elastrator, but the tail hung on for a long time, gathered dirt and burrs, and got a little high before it dropped off.

March 23: Twins, both males. I never solved the problem of separating the ewes with lambs from those which were expecting. Each evening I grabbed up an armful of lambs, and after their mothers had studied the situation at length and had decided that their bleating offspring was among those in my arms, they followed me into the feeding pen.

March 29: The buck didn't come up with the herd. Found him at the bottom of a gulley; thought he was dead, but I



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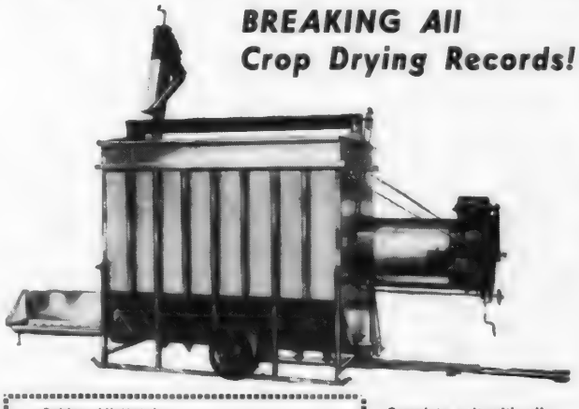

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finally prodded him to his feet and he made it to the barn.

March 30: The buck went out with the herd and seemed livelier.

March 31: Buck didn't show up again. This time he was dead when I found him —feet straight up in the air, and stiff. The vet cut him open. His sinus cavities were full of grubs and a bloody infection. This had evidently spread to his lungs; he died of a form of pneumonia. The vet says there's nothing one can do about head grubs except pray.

April 1: We've had a week of good weather and as soon as I open the gate, the sheep break for a south slope where the blue grass has grown a couple of inches during the last week. I cut down on the grain and supplement ration.

April 30: One more lamb this month and plenty of grass. The ewes now only sniff at dry rations, so I have cut them off altogether. The lambs are all nibbling grass and are getting fat.

May 15: Trimmed toenails today. The book says the soft ground and the spring rains stimulate the growth of the hoof, which is an understatement. Before I knew it, a heavy ewe began to limp. Her toes were turned to one side and the ends almost overlapped. Used shears and a wood rasp to feather the edges, taking care not to cut into the quick.

May 18: Four dogs from the village, out on a tour, crossed the pasture. The sheep stampeded to the barn but fortunately the dogs didn't give chase. From here on I penned the sheep at night to prevent dog trouble. Old sheep men tell me that the danger is usually from a pack of dogs out for a romp; the sheep run and the dogs join in the game, and then the fat is in the fire. The single dog, unless he is a killer, rarely causes trouble.

June 11: Last lamb came. Of the thirteen ewes I started with, one died, eleven lambed, and one just went along for the ride. But she was not old, and I decided to give her another chance. I had 16 lambs—five of the ewes had twins, six singles. All were doing well. There were seven ewes in the bunch to be held over.

Since the gestation period for sheep is 150 days, the buck, ailing as he was, sired the lambs of the last four ewes. The lambs varied in size from the newborn of June 11, to Little Nemo, who was fifty pounds.

June 15: Time to get the wool off the sheep. I didn't feel equal to the job, partly because I didn't think the low price of wool justified the cost of a power clipper. I found a man in the next county who said he would be in my neighborhood the last of this month and would shear my flock—at $1.00 per head, including the larger lambs. Wool being what it is, the man's price seemed high, but he had me. He got the job. The wool brought 54 cents, a lot different from the price a few years ago when they say the wool was sufficient to pay the feed bill for a ewe for a year.

The lambs, coming as they did over a

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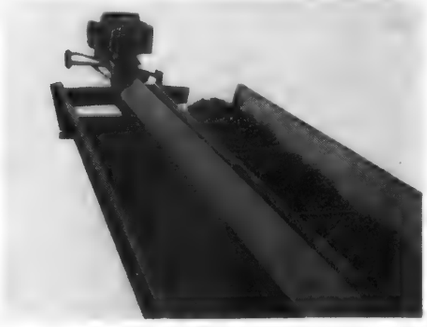

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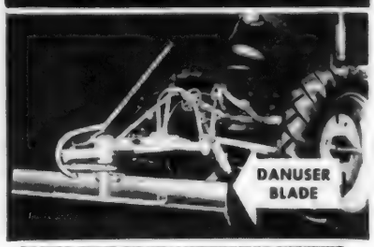

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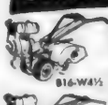

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period of five months, presented a marketing problem. I took the wether lambs to market, one at a time, from September to November, as they reached 75 to 80 lbs.

The professional sheep man, I am told, gets his lambs to 80 pounds in less than six months. But he creep feeds them, and his eye is better developed than mine. The difference in age and the problem of separating the small number of wethers from the ewe lambs, I felt, did not justify creep feeding in my operation.

Loosely speaking, I made $28.40 on the year's operation. My fence rows are neat and the pasture clean. The biggest return was the education in handling sheep. I found I like them, and with 19 ewes and the know-how gained with my first flock, I feel I can go ahead. Here is my bookkeeping of out-of-pocket and in-pocket cash:

DEBITS

14 sheep @ $20	$280.00
15 bu. corn @ $1.50	22.50
100 lbs. supplement	5.50
200 lbs. oats @ $3.80	7.60
100 lbs. bran	4.00
Salt, drugs, minerals	3.50
1200 lbs. hay @ $30 per ton	18.00
2 acres of hillside, scrub pasture	40.00
Loss of one ewe and one buck	40.00
Shearing	12.00
	$433.10

CREDITS

Reimbursed for 2 ewes	$ 40.00
Lambs sold	180.00
Wool	61.50
7 ewe lambs	180.00
	461.50

Credits	$461.50
Debits	433.10
Cash Profit	$28.40

In addition I have paid for 12 ewes out of my cash receipts and if I sold them, they would bring over $100.00.

There is one thing I would like to pass along to anyone who contemplates going into sheep in a big way. If, for example, a man wants to have 1,000 ewes, he'll have to find a way of cutting down on labor costs. If he puts as many man-hours on each animal as I put on mine, he'll need at least 200 shepherds (8-hour day) per 1,000 sheep.

POINTS FOR PLOWMEN

(*Continued from page* 61)

furrow that follows has to be as nearly on the level as possible to help hold water and soil. Because of the short rows and tight turns, an attached plow is often better than a trailing plow for contours.

When plowing was done with horses, some of it had to be turned wet or not at all. But with the mile an hour teams replaced with four and five mile an hour tractors that often work around the clock, most plowing now gets done when the weather is right.

BEST FARM HOISTS in St. Paul history!

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An ALL-PURPOSE Machine for LAND SMOOTHING, DIRT MOVING and a TILLAGE TOOL for Better Seed Bed Preparation

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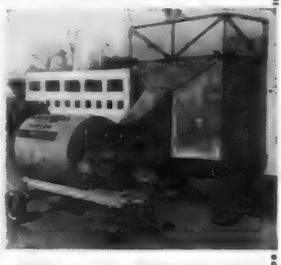

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Farm Products Division "A-2"
1101 Walnut, Des Moines, Iowa

If you plow too dry, you wear out plows and use extra fuel. If you plow too wet, plows won't scour right and you may be breeding a field of clods that'll keep you cussing all summer. "The old rule of thumb," says Cummins, "is to squeeze a handful of soil and if it balls up and won't fall apart it's too wet to plow."

There are arguments in favor of both fall and spring plowing. Fall plowing should be limited to level land that won't erode. Heavy soils plowed in the fall can be worked earlier in the spring. But where weeds are a serious problem, spring plowing controls them better than fall plowing. Plow sandy soils in the spring.

No one has yet found a method of using conventional moldboard plows and avoiding hardpan. The heavy wheels and the plow point are going to put it there and, like taxes, you have to live with it. One answer is to use a sub-soiler on the field every few years and break up the hardpan. Another is to plant legumes.

The attached plow is gaining favor. It is especially fitted to the small or medium size farms or those with small or odd shaped fields that require sharp turns. It's more maneuverable than a trailing plow. It will work closer to fences and is easier to handle on grassed waterways because the hydraulic lift makes it part of the tractor. It also takes less storage space. The attached plow, even though it sells at lower prices, isn't much of a threat to the trailing plow for working large open fields.

And, because there are times when the moldboard plow, versatile as it is, won't do the job right, there are other plows to replace it. Among these are the two-way, disk plow, and listing plow. Disk plows are growing in popularity. They do a good job on prairie land where mixing stubble into the top soil helps control wind and water erosion and conserves moisture. They also surpass the moldboard on land too wet to scour right or land too brushy for a regular plow.

The lister, or middle buster, shaped like an over-sized cultivator hoe, is used largely in the South and Southwest. The two-way plow, equipped with double bottoms facing opposite directions, is for throwing furrows uphill when plowing in either direction on hillsides and irrigated land.

With modern, high speed tractors and plows there is less need than there once was for the extra gadgets designed to give aid and comfort to the plow. One still widely used, though, is the jointer, a small shovel above and in front of the plow or attached to the rolling colter to cover some of the trash before the plow turns it over. The notched colter is another one used often for cutting especially heavy stubble and stalks. Log chains, wires, and weed hooks designed to help drag trash under the furrow slice are still common, but are being gradually put out of business by better plowing machinery.

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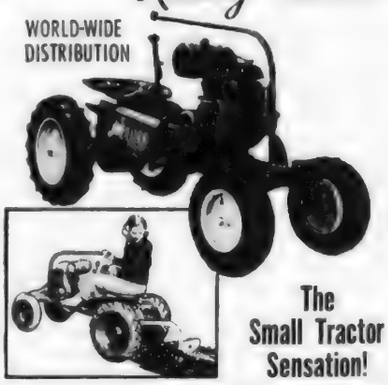

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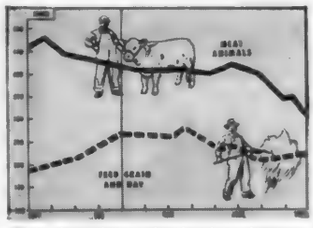

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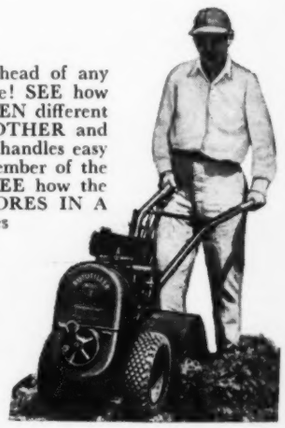

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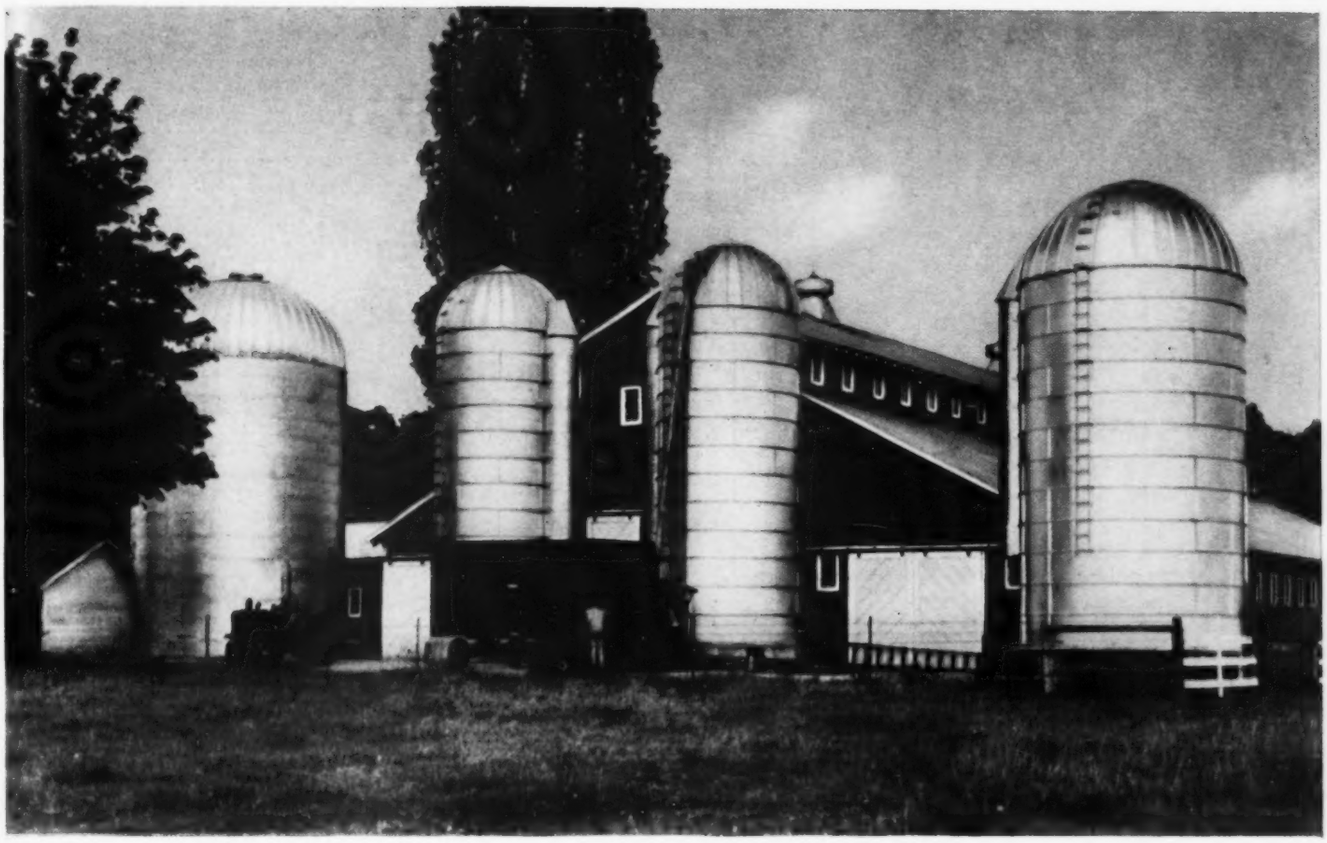
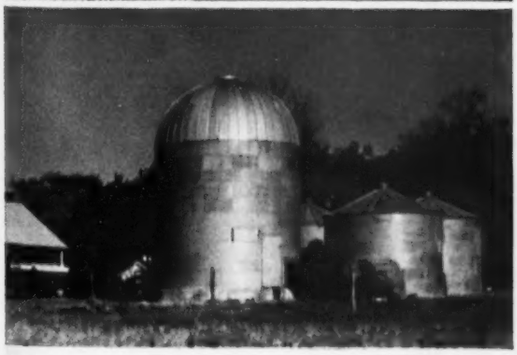


You need MORE than modern farm machinery

TO OPERATE A MODERN FARM



No modern farm can be without labor-saving machinery. But it takes more than that. Modern farming also requires housing, storage and conditioning methods that make the most of that modern machinery, and of present-day scientific knowledge of soils, seed, stock, and feeds.

You need corn cribs and grain bins that double as conditioning systems . . . buildings that let you load, unload and shell out corn without hand labor . . . silos and Haymakers that conserve the *food value* in the crops you raise . . . corn storage and conditioning methods that let you pick corn when it is *ripe* . . . self-feeding Haymakers so cattle can feed themselves . . . weather-proof, rat-proof, fire-proof, labor-saving buildings scientifically designed for modern farm operations.

For nearly 50 years, Martin Methods have helped farmers make the most of their crops—have pioneered in ways to cut farm operating costs while increasing farm productivity. The coupon below will bring you details on how to make the most of *your* next crop. Mail it today!

FREE HELPFUL FOLDERS

. . . SEND COUPON TODAY!

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MARTIN STEEL PRODUCTS CORPORATION

1503 Longview Ave., Mansfield, Ohio

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☐ SILOS ☐ HAYMAKERS ☐ GRASS FARMING ☐ DAIRY & BEEF CATTLE HOUSING

☐ GRAIN & CORN CONDITIONING ☐ IMPLEMENT STORAGE ☐ CHICK & POULTRY HOUSING

Name_____

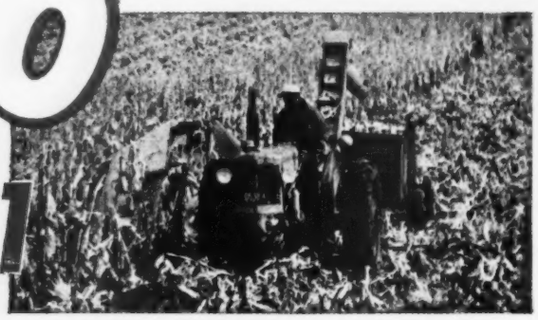
Address_____

City_____ State_____

5325

6 WAYS to make more corn money

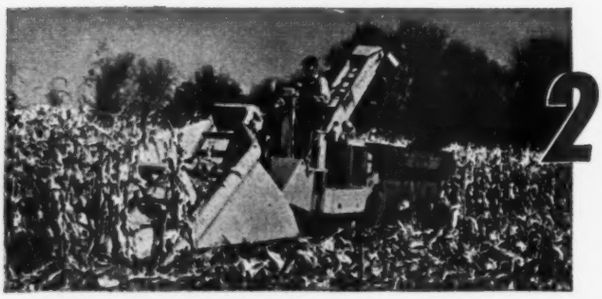
Now, get tomorrow's FASTER, LOWER-COST HUSKING with the MM HUSKOR that fits YOUR farm!



IMPROVED MM TWO-ROW HUSKOR

Proved and improved! This popular MM pull-behind Two-Row Huskor is packed with new MM advantages that save time, work and corn. Six gathering chains, large-capacity corn saver, dual-drive husking bed, belt-drive cleaning fan, and full Uni-Matic control of snapping assembly are outstanding features. Longer picking rolls and 12 husking rolls (6 metal and 6 rubber) handle your heaviest crops easily. Any 2-plow tractor pulls and powers this light-draft, big-capacity Huskor.

You can demand—and *get*—a *double pay-off* for your summer's work when you harvest your corn with an MM Huskor. *First*, Minneapolis-Moline gives you new design advantages that help you get all the crop you raise for real *bonus* yields . . . machines that deliver *clean* ears, easier to store and feed, worth more in cash. *Second*, all SIX MM corn-harvesting machines give you the speed and economy that let you get your crop in *faster*, *easier*, at *lowest* possible cost. This year, *gain* with the bonus values that make MM corn Shellers the world's leading sellers, that make MM Huskors and the Picker-Sheller preferred equipment in so many fields. Read the facts below. Make more money off *your* fields, off *your* corn crop.



MM UNI-HUSKOR

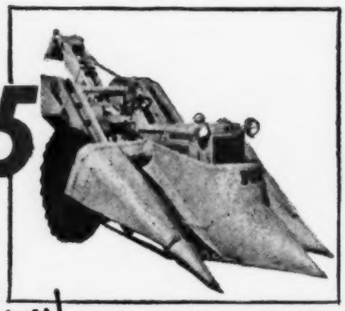
This self-propelled Uni-Tractor and Uni-Huskor unit pays big dividends in cleaner corn, picked *faster* and with *less work*. Typical MM features include five-position floating snouts, four 53½" long snapping rolls, ten 36" rubber and metal husking rolls, husking raddle with rotating and side-to-side action, cleaning fan for clean, husk-free corn—see it!

MM 1-ROW PULL-BEHIND HUSKOR

Here's husking capacity at its one-row best. This MM Huskor gives you all the owner-tested advantages that have made MM pull-behind models preferred on so many farms, *and* the advanced features that put this year's model right out in front of the field. Three gathering chains, eight new sectional type metal and rubber husking rolls, 53½" snapping rolls, Uni-Matic control of floating snouts . . . all combine to give you a real profit harvest of your corn crop. A one-row corn snapper is also available.

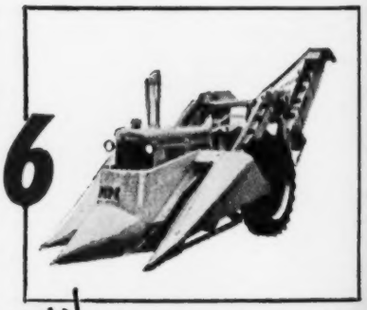
MM UNI-PICKER SHELLER

Here's the *one-man, one-trip* corn harvester that picks, and shells your corn *on-the-go* . . . *and* gives you the earliest corn harvest you've ever had! It's the MM Uni-Tractor with the Uni-Picker Sheller mounted piggy-back—built to handle corn up to 30% moisture content and above when necessary. You get your corn while the stalks are still standing, in one fast, easy trip through the field.



NEW MM MOUNTED HUSKOR FOR THE ZB TRACTOR

With the new MM Two-Row Mounted Huskor on the new 2-3 Plow ZB Tractor, you get self-propelled visibility and instant control. Four 53½" snapping rolls, six gathering chains, full-length and full-width husking raddle, ten 36" sectional type metal and rubber husking rolls, exclusive MM cleaning fan, large capacity corn saver, fingertip Uni-Matic control, and simple hookup for mounting, are features that pay you in a faster, easier, more *profitable* corn harvest.



NEW MM MOUNTED HUSKOR FOR THE UB TRACTOR

This new MM Mounted Huskor teams with the new 3-4 plow MM UB Tractor to give you visionlined, big-capacity corn husking at its low-cost best. Enjoy full Uni-Matic control at your fingertips . . . watch the four 53½" snapping rolls and the ten 36" combination steel and rubber husking rolls . . . large capacity corn saver and exclusive MM cleaning fan put *more* of your crop in the wagon—at a new low cost.

See for yourself how far corn harvesting has advanced since last year! Visit your MM dealer and see these advanced MM Huskors soon! Be sure to get facts on the sectional metal and rubber husking rolls.

MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA